Analyzing further equations concerning the "Letters from Ramanujan to G. H. Hardy" and "Manuscript Book 1". New possible mathematical connections with various sectors of Number Theory and Supersymmetry Breaking. V

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Abstract

In this research thesis, (part V) we analyze further equations concerning the "Letters from Ramanujan to G. H. Hardy" and "Manuscript Book 1". New possible mathematical connections with various sectors of Number Theory and Supersymmetry Breaking

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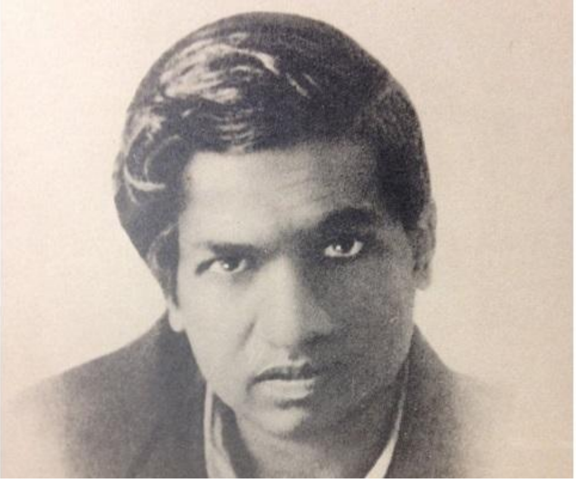
Srinivasa Ramanujan (1887-1920)



https://www.moduscc.it/ramanujan-il-grande-matematico-indiano-13453-131115/

Vesuvius landscape with gorse – Naples

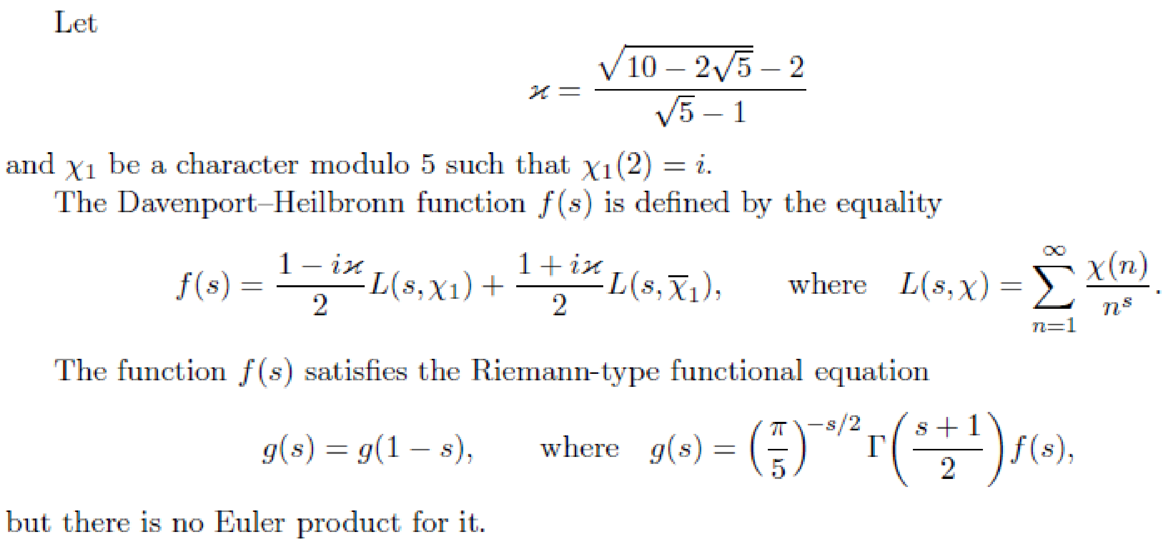
https://www.pinterest.it/pin/95068242114589901/

From:

On the Zeros of the Davenport Heilbronn Function
S. A. Gritsenko - Received May 15, 2016 - ISSN 0081-5438, Proceedings of the Steklov Institute of Mathematics, 2017, Vol. 296, pp. 65–87.

A. A. Karatsuba, “On the zeros of arithmetic Dirichlet series without Euler product,” Izv. Ross. Akad. Nauk, Ser. Mat. 57 (5), 3–14 (1993)

We have:



Let

$$\varkappa = \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

and χ_1 be a character modulo 5 such that $\chi_1(2) = i$.

The Davenport–Heilbronn function $f(s)$ is defined by the equality

$$f(s) = \frac{1-i\varkappa}{2}L(s,\chi_1) + \frac{1+i\varkappa}{2}L(s,\overline{\chi}_1), \qquad \text{where} \quad L(s,\chi) = \sum_{n=1}^{\infty}\frac{\chi(n)}{n^s}.$$

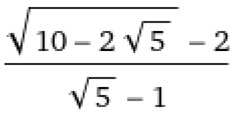
The function $f(s)$ satisfies the Riemann-type functional equation

$$g(s) = g(1-s), \qquad \text{where} \quad g(s) = \left(\frac{\pi}{5}\right)^{-s/2}\Gamma\left(\frac{s+1}{2}\right)f(s),$$

but there is no Euler product for it.

$$(\sqrt{10-2\sqrt{5}}-2)/(\sqrt{5}-1) = \kappa$$

Input:



$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

Decimal approximation:

0.2840790438404122960282918323931261690910880884457375827591626661

…

0.28407904384…. = κ

Alternate forms:

$$\frac{1}{4}\left(\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2\right)$$

$$\frac{1}{4}\left(1+\sqrt{5}\right)\left(\sqrt{10-2\sqrt{5}}-2\right)$$

$$\frac{1}{2}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

Minimal polynomial:

$$x^4+2x^3-6x^2-2x+1$$

Expanded forms:

$$\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-\frac{2}{\sqrt{5}-1}$$

$$\frac{1}{4}\sqrt{10-2\sqrt{5}}+\frac{1}{4}\sqrt{5\left(10-2\sqrt{5}\right)}+\frac{1}{2}\left(-1-\sqrt{5}\right)$$

For ((((√(10-2√5) -2))⁄((√5-1)))) = 8πG;   G = 0.011303146014

Indeed:

((((√(10-2√5) -2))⁄((√5-1))))/(8π)

Input:

$$\frac{\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}}{8\pi}$$

Result:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{8\left(\sqrt{5}-1\right)\pi}$$

Decimal approximation:

0.0113031460140052147973750129442035744685760313920017808594909667 …

0.01130314…. = g (gravitational coupling constant)

Property:

$$\frac{-2+\sqrt{10-2\sqrt{5}}}{8\left(-1+\sqrt{5}\right)\pi}$$ is a transcendental number

Alternate forms:

$$\frac{\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2}{32\pi}$$

$$-\frac{1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}}{16\pi}$$

$$\frac{-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}}{16\pi}$$

Expanded forms:

$$-\frac{1}{16\pi}-\frac{\sqrt{5}}{16\pi}+\frac{\sqrt{10-2\sqrt{5}}}{32\pi}+\frac{\sqrt{5\left(10-2\sqrt{5}\right)}}{32\pi}$$

$$\frac{\sqrt{10-2\sqrt{5}}}{8\left(\sqrt{5}-1\right)\pi}-\frac{1}{4\left(\sqrt{5}-1\right)\pi}$$

Series representations:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)\left(\sqrt{5}-1\right)}=\frac{-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}}{8\pi\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)\left(\sqrt{5}-1\right)}=\frac{-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}}{8\pi\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)(\sqrt{5}-1)} = \frac{-2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (10-2\sqrt{5}-z_0)^k z_0^{-k}}{k!}}{8\pi\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

We note that:

(((√(10-2√5) -2))/((√5-1)))*((2 i (sqrt(5) - 1) t + sqrt(5) - 1)/(2 (sqrt(2 (5 - sqrt(5))) - 2)))

Input:

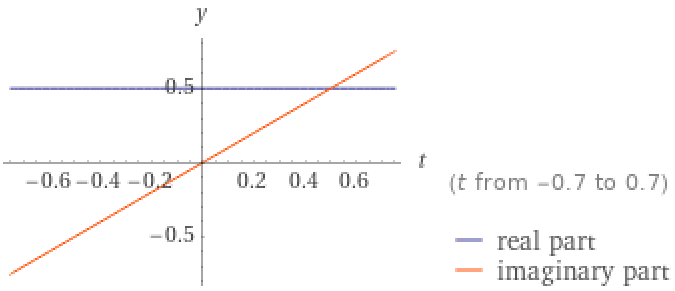
$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} \times \frac{2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}$$

i is the imaginary unit

Exact result:

$$\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{2\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}$$

Plot:



Alternate form assuming t>0:

$$\frac{i\sqrt{10-2\sqrt{5}}\;t}{\sqrt{2\left(5-\sqrt{5}\right)}-2}-\frac{2\,i\,t}{\sqrt{2\left(5-\sqrt{5}\right)}-2}+\frac{\sqrt{5\left(10-2\sqrt{5}\right)}}{2\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}-\frac{\sqrt{10-2\sqrt{5}}}{2\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}-\frac{\sqrt{5}}{\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}+\frac{1}{\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}$$

Alternate forms:

$$\frac{1}{8}\left(1+\sqrt{5}\right)\left(2\,i\sqrt{2\left(3-\sqrt{5}\right)}\;t+\sqrt{5}-1\right)$$

$$\frac{1}{2}\left(1+2\,i\,t\right)$$

$$\frac{1}{2}+i\,t$$

1/2+it *= real part of every nontrivial zero of the Riemann zeta function*

Derivative:

$$\frac{d}{dt}\left(\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{\left(\sqrt{5}-1\right)\left(2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)\right)}\right)=i$$

Indefinite integral:

$$\int \frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{\left(\sqrt{5}-1\right)\left(2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)\right)}\,dt = \frac{t}{2}+\frac{i\,t^{2}}{2} + \text{constant}$$

And again:

(((√(10-2√5) -2))⁄((2x)))*((2 i (sqrt(5) - 1) t + sqrt(5) - 1)/(2 (sqrt(2 (5 - sqrt(5))) - 2))) = (1/2+it)

Input:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{2x} \times \frac{2i\left(\sqrt{5}-1\right)t+\sqrt{5}-1}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)} = \frac{1}{2}+i\,t$$

i is the imaginary unit

Exact result:

$$\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{4\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} = \frac{1}{2}+i\,t$$

Alternate form assuming t and x are real:

$$\frac{\sqrt{5}-1}{x} = 2$$

Alternate form:

$$\frac{\left(\sqrt{5}-1\right)(1+2\,i\,t)}{4\,x} = \frac{1}{2} + i\,t$$

Alternate form assuming t and x are positive:

$$2\,x+1=\sqrt{5}$$

Expanded forms:

$$\frac{i\sqrt{5\left(10-2\sqrt{5}\right)}\;t}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} - \frac{i\sqrt{10-2\sqrt{5}}\;t}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} - \frac{i\sqrt{5}\;t}{\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} + \frac{i\,t}{\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} + \frac{\sqrt{5\left(10-2\sqrt{5}\right)}}{4\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} - \frac{\sqrt{10-2\sqrt{5}}}{4\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} - \frac{\sqrt{5}}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} + \frac{1}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x} = \frac{1}{2} + i\,t$$

$$\frac{i\sqrt{5}\;t}{2\,x} - \frac{i\,t}{2\,x} + \frac{\sqrt{5}}{4\,x} - \frac{1}{4\,x} = \frac{1}{2} + i\,t$$

Solutions:

$$t = \frac{i}{2}\,, \quad x \neq 0$$

$$x = \frac{\sqrt{5}}{2} - \frac{1}{2}$$

Input:

$$\frac{\sqrt{5}}{2}-\frac{1}{2}$$

Decimal approximation:

0.6180339887498948482045868343656381177203091798057628621354486227

…

0.6180339887…. $= \frac{1}{\phi}$

Solution for the variable x:

$$x = \frac{-2\,i\,\sqrt{5}\;t + 2\,i\,t - \sqrt{5}\; + 1}{-2 - 4\,i\,t}$$

Implicit derivatives:

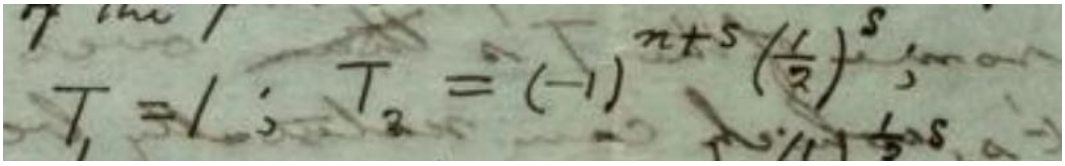
$$\frac{\partial x(t)}{\partial t} = \frac{2\left(-1+\sqrt{5}\; - 2\,x\right)x}{\left(-1+\sqrt{5}\right)(-i + 2\,t)}$$

$$\frac{\partial t(x)}{\partial x} = \frac{\left(-1+\sqrt{5}\right)(-i + 2\,t)}{2\left(-1+\sqrt{5}\; - 2\,x\right)x}$$

From: **Letters from Ramanujan to G. H. Hardy** – Attribution: Trinity College, Cambridge –

https://mss-cat.trin.cam.ac.uk/manuscripts/uv/view.php?n=Add.Ms.a.94.2#?c=0&m=0&s=0&cv=10&xywh=-2444%2C-1%2C9690%2C6043

We have that, for n = 4 , s = 8:



$T_1 = 1; \quad T_2 = (-1)^{n+s}\left(\frac{1}{2}\right)^s;$

(-1)^12*(1/2)^8

Input

$(-1)^{12}\left(\frac{1}{2}\right)^8$

Exact result

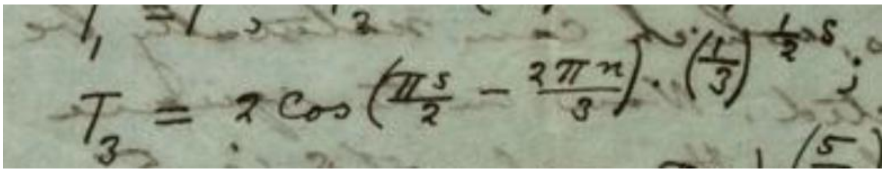
$\frac{1}{256}$

Decimal form

0.00390625

0.00390625

From:



$T_3 = 2\cos\left(\frac{\pi s}{2} - \frac{2\pi n}{3}\right)\cdot\left(\frac{1}{3}\right)^{\frac{1}{2}s};$

2 cos(1/2*8Pi-1/3*8Pi)*(1/3)^4

Input

$$2\cos\left(\frac{1}{2}\times 8\pi - \frac{1}{3}\times 8\pi\right)\left(\frac{1}{3}\right)^4$$

Exact result

$$-\frac{1}{81}$$

Decimal approximation

$-0.012345679012345679012345679012345679012345679012345679012345679\ldots$

-0.012345679….

Alternative representations

$$2\cos\left(\frac{8\pi}{2} - \frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = 2\cosh\left(\frac{4 i \pi}{3}\right)\left(\frac{1}{3}\right)^4$$

$$2\cos\left(\frac{8\pi}{2} - \frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = \frac{2\left(\frac{1}{3}\right)^4}{\sec\left(\frac{4\pi}{3}\right)}$$

$$2\cos\left(\frac{8\pi}{2} - \frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = \frac{2\left(\frac{1}{3}\right)^4}{\csc\left(\frac{11\pi}{6}\right)}$$

Series representations

$$2\cos\left(\frac{8\pi}{2} - \frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = \frac{2}{81}\sum_{k=0}^{\infty}\frac{\left(-\frac{16}{9}\right)^k \pi^{2k}}{(2k)!}$$

$$2\cos\left(\frac{8\pi}{2}-\frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 \propto \frac{2\sum_{k=0}^{\infty}(-1)^k \frac{\partial^{1+2k}}{\partial\left(\frac{4\pi}{3}\right)^{1+2k}}\delta\left(\frac{4\pi}{3}\right)}{81\,\theta\left(\frac{4\pi}{3}\right)}$$

$$2\cos\left(\frac{8\pi}{2}-\frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = -\frac{2}{81}\sum_{k=0}^{\infty}\frac{\left(\frac{6}{5}\right)^{-1-2k} e^{i k \pi}\,\pi^{1+2k}}{(1+2k)!}$$

Integral representations

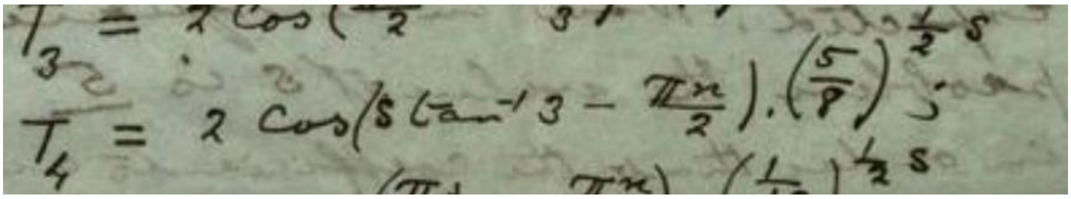
$$2\cos\left(\frac{8\pi}{2}-\frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = -\frac{2}{81}\int_{\frac{\pi}{2}}^{\frac{4\pi}{3}}\sin(t)\,dt$$

$$2\cos\left(\frac{8\pi}{2}-\frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = \frac{2}{81}-\frac{8\pi}{243}\int_0^1\sin\left(\frac{4\pi t}{3}\right)dt$$

$$2\cos\left(\frac{8\pi}{2}-\frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = \frac{\sqrt{\pi}}{81\,i\,\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-\left(4\pi^2\right)/(9s)+s}}{\sqrt{s}}\,ds \quad \text{for } \gamma > 0$$

$$2\cos\left(\frac{8\pi}{2}-\frac{8\pi}{3}\right)\left(\frac{1}{3}\right)^4 = \frac{\sqrt{\pi}}{81\,i\,\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{9}{4}\right)^s \pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds \quad \text{for } 0 < \gamma < \frac{1}{2}$$

From:



$$T_4 = 2\cos\left(8\tan^{-1}3 - \frac{\pi n}{2}\right).\left(\frac{5}{8}\right)^{\frac{1}{2}s}$$

For n = 4 , s = 8:

2 cos(8 tan^-1 (3) – 1/2*4Pi) (5/8)^4

Input

$$2\cos\left(8\tan^{-1}(3) - \frac{1}{2}\times 4\pi\right)\left(\frac{5}{8}\right)^4$$

$\tan^{-1}(x)$ is the inverse tangent function

Result

$$-\frac{527}{2048}$$

Decimal form

-0.25732421875

(result in radians)

-0.25732421875

Addition formulas

$$2\cos\left(8\tan^{-1}(3) - \frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = \frac{625\left(\cos(-2\pi)\cos\left(-8\tan^{-1}(3)\right) + \sin(-2\pi)\sin\left(-8\tan^{-1}(3)\right)\right)}{2048}$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = \frac{625\left(\cos(-2\pi)\cos\left(8\tan^{-1}(3)\right)-\sin(-2\pi)\sin\left(8\tan^{-1}(3)\right)\right)}{2048}$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = \frac{625\left(\cosh\left(8\,i\tan^{-1}(3)\right)\cos(-2\pi)+i\sinh\left(8\,i\tan^{-1}(3)\right)\sin(-2\pi)\right)}{2048}$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = \frac{625\left(\cosh\left(-8\,i\tan^{-1}(3)\right)\cos(-2\pi)-i\left(\sinh\left(-8\,i\tan^{-1}(3)\right)\sin(-2\pi)\right)\right)}{2048}$$

Alternative representations

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = 2\cosh\left(i\left(-2\pi+8\tan^{-1}(3)\right)\right)\left(\frac{5}{8}\right)^4$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = 2\cosh\left(-i\left(-2\pi+8\tan^{-1}(3)\right)\right)\left(\frac{5}{8}\right)^4$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = \left(e^{-i\left(-2\pi+8\tan^{-1}(3)\right)}+e^{i\left(-2\pi+8\tan^{-1}(3)\right)}\right)\left(\frac{5}{8}\right)^4$$

Series representations

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 = \frac{625\cos\left(8\sum_{k=0}^{\infty}\frac{(-1)^k\,3^{-1-2k}}{1+2k}\right)}{2048}$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=\frac{625\sum_{k=0}^{\infty}\frac{(-1)^k\left(8\tan^{-1}(3)\right)^{2k}}{(2k)!}}{2048}$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=-\frac{625\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{\pi}{2}+8\tan^{-1}(3)\right)^{1+2k}}{(1+2k)!}}{2048}$$

Integral representations

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=-\frac{625}{2048}\int_{\frac{\pi}{2}}^{8\tan^{-1}(3)}\sin(t)\,dt$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=\frac{625}{2048}-\frac{625}{256}\tan^{-1}(3)\int_0^1\sin\left(8\,t\tan^{-1}(3)\right)dt$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=-\frac{625\,i}{4096\sqrt{\pi}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\left(16\tan^{-1}(3)^2\right)/s}}{\sqrt{s}}\,ds \quad \text{for } \gamma>0$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=-\frac{625\,i}{4096\sqrt{\pi}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(4\tan^{-1}(3)\right)^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds$$

$$\text{for } 0<\gamma<\frac{1}{2}$$

Continued fraction representations

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=\frac{625\cos\left(\cfrac{24}{1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{9k^2}{1+2k}}\right)}{2048}=\frac{625\cos\left(\cfrac{24}{1+\cfrac{9}{3+\cfrac{36}{5+\cfrac{81}{7+\cfrac{144}{9+\dots}}}}}\right)}{2048}$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=$$

$$\frac{625\cos\left(\cfrac{24}{1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{9(1-2k)^2}{10-16k}}\right)}{2048}=\frac{625\cos\left(\cfrac{24}{1+\cfrac{9}{-6+\cfrac{81}{-22+\cfrac{225}{-38+\cfrac{441}{-54+\dots}}}}}\right)}{2048}$$

$$2\cos\left(8\tan^{-1}(3)-\frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4=$$

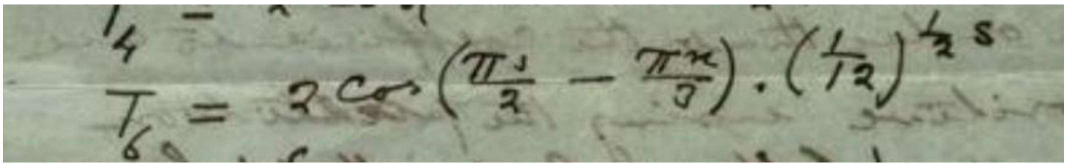
$$\frac{625\cos\left(8\left(3-\cfrac{27}{3+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{9\left(1+(-1)^{1+k}+k\right)^2}{3+2k}}\right)\right)}{2048}=\frac{625\cos\left(8\left(3-\cfrac{27}{3+\cfrac{81}{5+\cfrac{36}{7+\cfrac{225}{9+\cfrac{144}{11+\dots}}}}}\right)\right)}{2048}$$

$$2\cos\left(8\tan^{-1}(3) - \frac{4\pi}{2}\right)\left(\frac{5}{8}\right)^4 =$$

$$\frac{625\cos\left(\frac{24}{10 + \underset{k=1}{\overset{\infty}{\mathrm{K}}} \frac{18\left(1-2\left\lfloor\frac{1+k}{2}\right\rfloor\right)\left\lfloor\frac{1+k}{2}\right\rfloor}{\frac{1}{2}\left(11+9(-1)^k\right)(1+2k)}}\right)}{2048} = \frac{625\cos\left(\cfrac{24}{10 + -\cfrac{18}{3 - \cfrac{18}{50 - \cfrac{108}{7 - \cfrac{108}{90 + \ldots}}}}}\right)}{2048}$$

$\underset{k=k_1}{\overset{k_2}{\mathrm{K}}} a_k / b_k$ is a continued fraction

From:



$T_6 = 2\cos\left(\frac{\pi s}{2} - \frac{\pi x}{3}\right).\left(\frac{1}{12}\right)^{\frac{1}{2}s}$

2 cos(1/2*8Pi – 1/3*4Pi) (1/12)^4

Input

$$2\cos\left(\frac{1}{2}\times 8\pi - \frac{1}{3}\times 4\pi\right)\left(\frac{1}{12}\right)^4$$

Exact result

$$-\frac{1}{20736}$$

Decimal approximation

$-0.000048225308641975308641975308641975308641975308641975308641975\ldots$

-0.0000482253086….

Alternative representations

$$2\cos\left(\frac{8\pi}{2}-\frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = 2\cosh\left(\frac{8 i \pi}{3}\right)\left(\frac{1}{12}\right)^4$$

$$2\cos\left(\frac{8\pi}{2}-\frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = \frac{2\left(\frac{1}{12}\right)^4}{\sec\left(\frac{8\pi}{3}\right)}$$

$$2\cos\left(\frac{8\pi}{2}-\frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = \frac{2\left(\frac{1}{12}\right)^4}{\csc\left(\frac{19\pi}{6}\right)}$$

Series representations

$$2\cos\left(\frac{8\pi}{2}-\frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = \frac{\sum_{k=0}^{\infty}\frac{\left(-\frac{64}{9}\right)^k \pi^{2k}}{(2k)!}}{10368}$$

$$2\cos\left(\frac{8\pi}{2}-\frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 \propto \frac{\sum_{k=0}^{\infty}(-1)^k \frac{\partial^{1+2k}}{\partial\left(\frac{8\pi}{3}\right)^{1+2k}}\delta\left(\frac{8\pi}{3}\right)}{10368\,\theta\left(\frac{8\pi}{3}\right)}$$

$$2\cos\left(\frac{8\pi}{2}-\frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = -\frac{\sum_{k=0}^{\infty}\frac{\left(\frac{6}{13}\right)^{-1-2k} e^{i k \pi}\pi^{1+2k}}{(1+2k)!}}{10368}$$

Integral representations

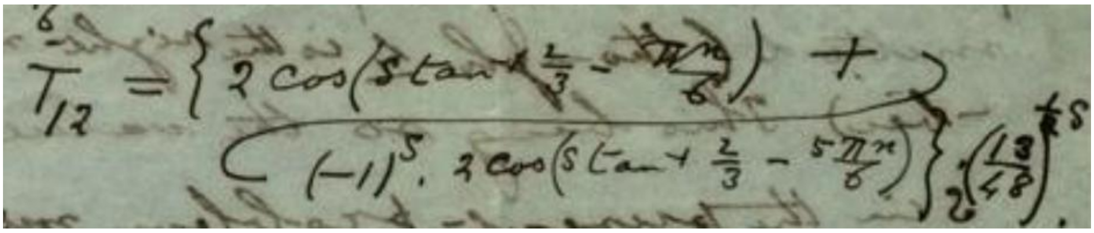
$$2\cos\left(\frac{8\pi}{2}-\frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = -\frac{1}{10368}\int_{\frac{\pi}{2}}^{\frac{8\pi}{3}}\sin(t)\,dt$$

$$2\cos\left(\frac{8\pi}{2} - \frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = \frac{1}{10\,368} - \frac{\pi}{3888}\int_0^1 \sin\left(\frac{8\pi t}{3}\right) dt$$

$$2\cos\left(\frac{8\pi}{2} - \frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = \frac{\sqrt{\pi}}{20\,736\, i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{-\left(16\pi^2\right)/(9s)+s}}{\sqrt{s}}\, ds \quad \text{for } \gamma > 0$$

$$2\cos\left(\frac{8\pi}{2} - \frac{4\pi}{3}\right)\left(\frac{1}{12}\right)^4 = \frac{\sqrt{\pi}}{20\,736\, i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\left(\frac{9}{16}\right)^s \pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2} - s\right)}\, ds \quad \text{for } 0 < \gamma < \frac{1}{2}$$

From:



$$T_{12} = \left\{ 2\cos\left(s\tan^{-1}\frac{2}{3} - \frac{\pi x}{6}\right) + (-1)^s \cdot 2\cos\left(s\tan^{-1}\frac{2}{3} - \frac{5\pi x}{6}\right)\right\} 2\left(\frac{13}{48}\right)^{\frac{1}{2}s}.$$

((2 cos(8 tan^-1(2/3)-1/6*4Pi)+(-1)^5 * 2 cos(8 tan^-1(2/3) – 5/6*4Pi))) (13/48)^4

Input

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right) - \frac{1}{6}\times 4\pi\right) + (-1)^5 \times 2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right) - \frac{5}{6}\times 4\pi\right)\right)\left(\frac{13}{48}\right)^4$$

$\tan^{-1}(x)$ is the inverse tangent function

Exact Result

$$\frac{28\,561\left(2\sin\left(\frac{\pi}{6} + 8\tan^{-1}\left(\frac{2}{3}\right)\right) - 2\sin\left(\frac{\pi}{6} - 8\tan^{-1}\left(\frac{2}{3}\right)\right)\right)}{5\,308\,416}$$

(result in radians)

Decimal approximation

$-0.0186373377912232709354895575303094990294229080949286833350 18901$

$\ldots$

(result in radians)

-0.01863733779….

Alternate forms

$$-\frac{595}{18\,432\sqrt{3}}$$

$$-\frac{28\,561\left(\sin\left(\frac{\pi}{6}-8\tan^{-1}\left(\frac{2}{3}\right)\right)-\sin\left(\frac{\pi}{6}+8\tan^{-1}\left(\frac{2}{3}\right)\right)\right)}{2\,654\,208}$$

$$\frac{845\left(\cos\left(2\tan^{-1}\left(\frac{2}{3}\right)\right)-\sin\left(2\tan^{-1}\left(\frac{2}{3}\right)\right)\right)\left(\sin\left(2\tan^{-1}\left(\frac{2}{3}\right)\right)+\cos\left(2\tan^{-1}\left(\frac{2}{3}\right)\right)\right)}{18\,432\sqrt{3}}$$

Expanded form

$$\frac{28\,561\sin\left(\frac{\pi}{6}+8\tan^{-1}\left(\frac{2}{3}\right)\right)}{2\,654\,208}-\frac{28\,561\sin\left(\frac{\pi}{6}-8\tan^{-1}\left(\frac{2}{3}\right)\right)}{2\,654\,208}$$

Addition formula

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4=$$
$$-\frac{595}{18\,432\sqrt{3}}$$

Alternative representations

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = \left(2\cosh\left(i\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)\right)+2\cosh\left(i\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{20\pi}{6}\right)\right)(-1)^5\right)\left(\frac{13}{48}\right)^4$$

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = \left(2\cosh\left(-i\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)\right)+2\cosh\left(-i\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{20\pi}{6}\right)\right)(-1)^5\right)\left(\frac{13}{48}\right)^4$$

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = \left((-1)^5\left(e^{-i\left(8\tan^{-1}(2/3)-(20\pi)/6\right)}+e^{i\left(8\tan^{-1}(2/3)-(20\pi)/6\right)}\right)+e^{-i\left(8\tan^{-1}(2/3)-(4\pi)/6\right)}+e^{i\left(8\tan^{-1}(2/3)-(4\pi)/6\right)}\right)\left(\frac{13}{48}\right)^4$$

Series representations

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = \frac{28\,561\sin\left(8\sum_{k=0}^{\infty}\frac{\left(\frac{3}{2}\right)^{-1-2k}e^{i k\pi}}{1+2k}\right)}{884\,736\sqrt{3}}$$

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = \sum_{k=0}^{\infty}-\frac{28\,561\,(-1)^k\left(\left(-\frac{\pi}{3}-8\tan^{-1}\left(\frac{2}{3}\right)\right)^{2k}-\left(-\frac{\pi}{3}+8\tan^{-1}\left(\frac{2}{3}\right)\right)^{2k}\right)}{2\,654\,208\,(2k)!}$$

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times 4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = \sum_{k=0}^{\infty}\left(-\frac{28\,561\,(-1)^k\left(\frac{\pi}{6}-8\tan^{-1}\left(\frac{2}{3}\right)\right)^{1+2k}}{2\,654\,208\,(1+2k)!}+\frac{28\,561\,(-1)^k\left(\frac{\pi}{6}+8\tan^{-1}\left(\frac{2}{3}\right)\right)^{1+2k}}{2\,654\,208\,(1+2k)!}\right)$$

Integral representations

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times 4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = -\frac{28\,561}{15\,925\,248}\int_0^1\left(\left(\pi-48\tan^{-1}\left(\frac{2}{3}\right)\right)\cos\left(\frac{1}{6}\,t\left(\pi-48\tan^{-1}\left(\frac{2}{3}\right)\right)\right)-\left(\pi+48\tan^{-1}\left(\frac{2}{3}\right)\right)\cos\left(\frac{1}{6}\,t\left(\pi+48\tan^{-1}\left(\frac{2}{3}\right)\right)\right)\right)dt$$

$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^5\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times 4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^4 = \frac{28\,561}{5\,308\,416}\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{i\,e^{s-\left(\frac{\pi}{6}-8\tan^{-1}\left(\frac{2}{3}\right)\right)^2/(4s)}\left(\frac{\pi}{6}-8\tan^{-1}\left(\frac{2}{3}\right)\right)}{2\sqrt{\pi}\,s^{3/2}}-\frac{i\,e^{s-\left(\frac{\pi}{6}+8\tan^{-1}\left(\frac{2}{3}\right)\right)^2/(4s)}\left(\frac{\pi}{6}+8\tan^{-1}\left(\frac{2}{3}\right)\right)}{2\sqrt{\pi}\,s^{3/2}}\right)ds \quad \text{for } \gamma > 0$$

Continued fraction representations

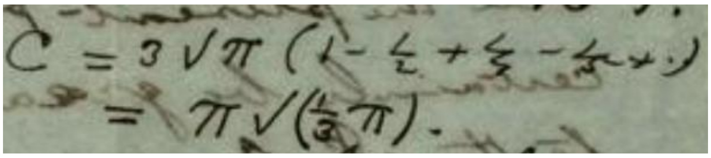
$$\left(2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{4\pi}{6}\right)+(-1)^{5}\,2\cos\left(8\tan^{-1}\left(\frac{2}{3}\right)-\frac{5\times 4\pi}{6}\right)\right)\left(\frac{13}{48}\right)^{4}=$$

$$\frac{28\,561\sin\left(\frac{16}{3\left(1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{\frac{4k^{2}}{9}}{1+2k}\right)}\right)}{884\,736\sqrt{3}}=\frac{28\,561\sin\left(\frac{16}{3\left(1+\frac{4}{9\left(3+\frac{16}{9\left(5+\frac{4}{7+\frac{64}{9(9+\ldots)}}\right)}\right)}\right)}\right)}{884\,736\sqrt{3}}$$

From the following values

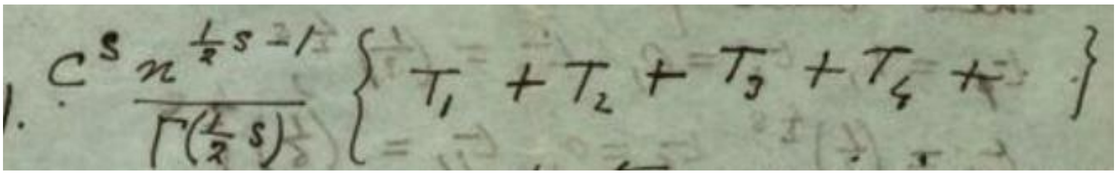
$$1 \quad \frac{1}{256} \quad -\frac{1}{81} \quad -\frac{527}{2048} \quad -\frac{1}{20736} \quad -\frac{595}{18432\sqrt{3}}$$

And:



$$C = 3\sqrt{\pi}\left(1-\frac{1}{2}+\frac{1}{4}-\frac{1}{5}+..\right)$$
$$= \pi\sqrt{\left(\frac{1}{3}\pi\right)}.$$

From:



$$1.\ \frac{c^{s}\, n^{\frac{1}{2}s-1}}{\Gamma(\frac{1}{2}s)}\left\{T_1 + T_2 + T_3 + T_4 + \right\}$$

we obtain:

((((Pi*sqrt(1/3*Pi))^8) * 4^3)) / ((gamma(4))) * (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3))

Input

$$\frac{\left(\pi\sqrt{\frac{1}{3}\pi}\right)^8 \times 4^3}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)$$

$\Gamma(x)$ is the gamma function

Exact result

$$\frac{32}{243}\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{12}$$

Decimal approximation

87092.877987132683618746771000660292450459430327786589700478225458…

87092.87798713….

Property

$\frac{32}{243}\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{12}$ is a transcendental number

Alternate forms

$$\frac{\left(121\,793 - 1785\sqrt{3}\right)\pi^{12}}{1\,259\,712}$$

$$-\frac{7\left(255\sqrt{3} - 17\,399\right)\pi^{12}}{1\,259\,712}$$

$$\left(\frac{121\,793}{1\,259\,712} - \frac{595}{139\,968\sqrt{3}}\right)\pi^{12}$$

Expanded form

$$\frac{121\,793\,\pi^{12}}{1\,259\,712} - \frac{595\,\pi^{12}}{139\,968\sqrt{3}}$$

Alternative representations

$$\frac{\left(1 + \frac{1}{256} - \frac{1}{81} - \frac{527}{2048} - \frac{1}{20\,736} - \frac{595}{18\,432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8} 4^{3}\right)}{\Gamma(4)} =$$
$$\frac{1}{6} \times 4^{3}\left(1 - \frac{1}{81} + \frac{1}{256} - \frac{527}{2048} - \frac{1}{20\,736} - \frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8}$$

$$\frac{\left(1 + \frac{1}{256} - \frac{1}{81} - \frac{527}{2048} - \frac{1}{20\,736} - \frac{595}{18\,432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8} 4^{3}\right)}{\Gamma(4)} =$$
$$\frac{4^{3}\left(1 - \frac{1}{81} + \frac{1}{256} - \frac{527}{2048} - \frac{1}{20\,736} - \frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8}}{3!}$$

$$\frac{\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)}{\Gamma(4)} = \frac{4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{\Gamma(4,0)}$$

Series representations

$$\frac{\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)}{\Gamma(4)} = \frac{7\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^8}{2592\sqrt{3}\sum_{k=0}^{\infty}\frac{(4-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

$$\frac{\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)}{\Gamma(4)} = \frac{1}{2592\sqrt{3}}7\pi^7\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^8 \sum_{k=0}^{\infty}(4-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}$$

$$\frac{\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)}{\Gamma(4)} = \left(7\pi^8\exp^8\left(i\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^7\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k(\pi-3x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8 \left(-765+17\,399\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Bigg/ \left(2592\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\Gamma(4)\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for $(x \in \mathbb{R}$ and $x < 0)$

Integral representations

$$\frac{\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8} 4^{3}\right)}{\Gamma(4)} = \frac{7\pi^{8}\left(-765+17399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{8}}{2592\sqrt{3}\int_{0}^{\infty}e^{-t}\,t^{3}\,dt}$$

$$\frac{\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8} 4^{3}\right)}{\Gamma(4)} = \frac{7\,e^{-\int_{0}^{1}\left(-3+x+x^{2}+x^{3}\right)/\log(x)\,dx}\,\pi^{8}\left(-765+17399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{8}}{2592\sqrt{3}}$$

$$\frac{\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18432\sqrt{3}}\right)\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8} 4^{3}\right)}{\Gamma(4)} = \frac{7\pi^{8}\left(-765+17399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{8}}{2592\sqrt{3}\int_{0}^{1}\log^{3}\left(\frac{1}{t}\right)dt}$$

From which:

1/50(((((Pi*sqrt(1/3*Pi))^8) * 4^3)) / ((gamma(4))) * (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3)))-4Pi-((((√(10-2√5) -2))⁄((√5-1))))

Input

$$\frac{1}{50}\left(\frac{\left(\pi\sqrt{\frac{1}{3}\pi}\right)^{8}\times 4^{3}}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18432\sqrt{3}}\right)\right)- 4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

$\Gamma(x)$ is the gamma function

Exact result

$$-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}-4\pi+\frac{16\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\pi^{12}}{6075}$$

Decimal approximation

1729.0071100844540871250565546476947113033088408697856331429055681

…

1729.007110084454….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Property

$$-\frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}-4\pi+\frac{16\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\pi^{12}}{6075}$$

is a transcendental number

Alternate forms

$$\frac{1}{2}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)-4\pi+\frac{\left(121793-1785\sqrt{3}\right)\pi^{12}}{62985600}$$

$$\frac{1}{2}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)-4\pi-\frac{7\left(255\sqrt{3}-17399\right)\pi^{12}}{62985600}$$

$$\frac{2-\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-4\pi-\frac{7\left(255\sqrt{3}-17399\right)\pi^{12}}{62985600}$$

Expanded form

$$\frac{2}{\sqrt{5}-1}-\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-4\pi+\frac{121\,793\,\pi^{12}}{62\,985\,600}-\frac{119\,\pi^{12}}{1\,399\,680\sqrt{3}}$$

Alternative representations

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}= -4\pi+\frac{4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{6\times 50}- \frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}$$

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}= -4\pi+\frac{4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{50\times 3!}- \frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}$$

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}= -4\pi+\frac{4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{50\,\Gamma(4,0)}- \frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}$$

Series representations

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=$$

$$-4\pi+\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}+\frac{7\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^8}{129\,600\sqrt{3}\sum_{k=0}^{\infty}\frac{(4-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

for $(z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=$$

$$-4\pi-\frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}+\frac{32\pi^8\left(\frac{121\,793}{165\,888}-\frac{595}{18432\sqrt{3}}\right)\sqrt{\frac{\pi}{3}}^8}{25\sum_{k=0}^{\infty}\frac{(4-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

for $(z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=$$

$$\begin{aligned}
&\Bigg(5355\,\pi^8\exp^8\!\left(i\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,7}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k(\pi-3x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8+\\
&\quad 259\,200\exp\!\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\Gamma(4)\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+\\
&\quad 518\,400\,\pi\exp\!\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\Gamma(4)\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}-\\
&\quad 121\,793\,\pi^8\exp\!\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp^8\!\left(i\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,8}\\
&\qquad\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k(\pi-3x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}-\\
&\quad 5355\,\pi^8\exp\!\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\exp^8\!\left(i\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,8}\\
&\qquad\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k(\pi-3x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}-\\
&\quad 518\,400\,\pi\exp\!\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\!\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\Gamma(4)\sqrt{x}\\
&\qquad\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(3-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}+\\
&\quad 121\,793\,\pi^8\exp\!\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\!\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\\
&\qquad\exp^8\!\left(i\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,9}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k(\pi-3x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8\\
&\qquad\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(3-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}-\\
&\quad 129\,600\exp\!\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\!\left(i\pi\left\lfloor\frac{\arg\left(10-x-2\sqrt{5}\right)}{2\pi}\right\rfloor\right)\Gamma(4)\sqrt{x}\\
&\qquad\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(3-x)^{k_1}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(10-x-2\sqrt{5}\right)^{k_2}}{k_1!\,k_2!}\Bigg)\\
&\Bigg/\Bigg(129\,600\exp\!\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\Gamma(4)\\
&\quad\left(\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\\
&\quad\left(-1+\exp\!\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg)
\end{aligned}$$

for ($x \in \mathbb{R}$ and $x < 0$)

Integral representations

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=$$
$$-4\pi+\frac{7\,e^{-\int_0^1(-3+x+x^2+x^3)/\log(x)\,dx}\,\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^8}{129\,600\sqrt{3}}+$$
$$\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}$$

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=$$
$$-4\pi+\frac{7\exp\left(4\gamma-\int_0^1\frac{1-x^4+\log(x^4)}{\log(x)-x\log(x)}\,dx\right)\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^8}{129\,600\sqrt{3}}+$$
$$\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}$$

$$\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\Gamma(4)\,50}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=$$
$$-4\pi+-\frac{7\,i\left(-765+17\,399\sqrt{3}\right)\pi^{11}}{20\,995\,200\sqrt{3}}\oint_L\frac{e^t}{t^4}\,dt+\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}$$

$\log(x)$ is the natural logarithm

γ is the Euler-Mascheroni constant

And again:

(1/50(((((Pi*sqrt(1/3*Pi))^8) * 4^3)) / ((gamma(4))) * (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3)))-4Pi-((((√(10-2√5) -2))⁄((√5-1)))))^1/15

Input

$$\left(\frac{1}{50}\left(\frac{\left(\pi\sqrt{\frac{1}{3}\pi}\right)^8\times 4^3}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)\text{^}(1/15)$$

$\Gamma(x)$ is the gamma function

Exact result

$$\sqrt[15]{-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}-4\pi+\frac{16\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{12}}{6075}}$$

Decimal approximation

1.6438156794000747336440780787055537828581104941197786842906286312

…

1.6438156794…. ≈ $\zeta(2)=\frac{\pi^2}{6}$ = 1.644934 ... (trace of the instanton shape)

Property

$$\sqrt[15]{-\frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}-4\pi+\frac{16\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{12}}{6075}}$$

is a transcendental number

Alternate forms

$$\sqrt[15]{\frac{1}{2}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)-4\pi+\frac{\left(121\,793-1785\sqrt{3}\right)\pi^{12}}{62\,985\,600}}$$

$$\sqrt[15]{\frac{1}{2}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)-4\pi-\frac{7\left(255\sqrt{3}-17399\right)\pi^{12}}{62\,985\,600}}$$

$$\sqrt[15]{-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}-4\pi+\left(\frac{121\,793}{62\,985\,600}-\frac{119}{1\,399\,680\sqrt{3}}\right)\pi^{12}}$$

(1/27((1/50(((((Pi*sqrt(1/3*Pi))^8) * 4^3)) / ((gamma(4))) * (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3)))-4Pi-((((√(10-2√5) -2))/((√5-1)))))-1))^2

Input

$$\left(\frac{1}{27}\left(\left(\frac{1}{50}\left(\frac{\left(\pi\sqrt{\frac{1}{3}\pi}\right)^{8}\times 4^{3}}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)-1\right)\right)^{2}$$

$\Gamma(x)$ is the gamma function

Exact result

$$\frac{1}{729}\left(-1-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}-4\pi+\frac{16\left(\frac{121793}{165888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{12}}{6075}\right)^{2}$$

Decimal approximation

4096.0337071363876900527391824400091300287277859447835756676251612…

4096.033707136…. ≈ 4096 = 64^2

Property

$$\frac{1}{729}\left(-1-\frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}-4\pi+\frac{16\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\pi^{12}}{6075}\right)^2$$

is a transcendental number

Alternate forms

$$\frac{1}{729}\left(\frac{1}{2}\left(-1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)-4\pi+\frac{\left(121793-1785\sqrt{3}\right)\pi^{12}}{62985600}\right)^2$$

$$\frac{1}{729}\left(\frac{1}{2}\left(1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)+4\pi+\frac{7\left(255\sqrt{3}-17399\right)\pi^{12}}{62985600}\right)^2$$

$$\frac{1}{729}\left(1+\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}+4\pi+\frac{7\left(255\sqrt{3}-17399\right)\pi^{12}}{62985600}\right)^2$$

Expanded form

$$\frac{1}{729}+\frac{14}{729\left(\sqrt{5}-1\right)^2}-\frac{2\sqrt{5}}{729\left(\sqrt{5}-1\right)^2}-\frac{4\sqrt{10-2\sqrt{5}}}{729\left(\sqrt{5}-1\right)^2}-$$

$$\frac{4}{729\left(\sqrt{5}-1\right)}+\frac{2\sqrt{10-2\sqrt{5}}}{729\left(\sqrt{5}-1\right)}+\frac{8\pi}{729}-\frac{16\pi}{729\left(\sqrt{5}-1\right)}+$$

$$\frac{8\sqrt{10-2\sqrt{5}}\,\pi}{729\left(\sqrt{5}-1\right)}+\frac{16\pi^2}{729}-\frac{121793\pi^{12}}{22958251200}+\frac{119\pi^{12}}{510183360\sqrt{3}}+$$

$$\frac{121793\pi^{12}}{11479125600\left(\sqrt{5}-1\right)}-\frac{119\pi^{12}}{255091680\sqrt{3}\left(\sqrt{5}-1\right)}+$$

$$\frac{119\sqrt{\frac{1}{3}\left(10-2\sqrt{5}\right)}\,\pi^{12}}{510183360\left(\sqrt{5}-1\right)}-\frac{121793\sqrt{10-2\sqrt{5}}\,\pi^{12}}{22958251200\left(\sqrt{5}-1\right)}-\frac{121793\pi^{13}}{5739562800}+$$

$$\frac{119\pi^{13}}{127545840\sqrt{3}}+\frac{3710773381\pi^{24}}{723019613391360000}-\frac{14493367\pi^{24}}{32134205039616000\sqrt{3}}$$

Alternative representations

$$\Bigg(\frac{1}{27}\Bigg(\Bigg(\Bigg(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18432\sqrt{3}}\right)}{50\,\Gamma(4)} - 4\pi - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\Bigg)-1\Bigg)\Bigg)^2 = \left(\frac{1}{27}\left(-1-4\pi+\frac{4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{6\times 50}-\frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}\right)\right)^2$$

$$\Bigg(\frac{1}{27}\Bigg(\Bigg(\Bigg(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18432\sqrt{3}}\right)}{50\,\Gamma(4)} - 4\pi - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\Bigg)-1\Bigg)\Bigg)^2 = \left(\frac{1}{27}\left(-1-4\pi+\frac{4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{50\times 3!}-\frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}\right)\right)^2$$

$$\Bigg(\frac{1}{27}\Bigg(\Bigg(\Bigg(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18432\sqrt{3}}\right)}{50\,\Gamma(4)} - 4\pi - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\Bigg)-1\Bigg)\Bigg)^2 =$$

$$\left(\frac{1}{27}\left(-1-4\pi+\frac{4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{50\,\Gamma(4,0)} - \frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}\right)\right)^2$$

Series representations

$$\Bigg(\frac{1}{27}\Bigg(\Bigg(\Bigg(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18432\sqrt{3}}\right)}{50\,\Gamma(4)} - 4\pi - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\Bigg)-1\Bigg)\Bigg)^2 =$$

$$\frac{1}{729}\left(-1-4\pi+\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}+\frac{7\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^8}{129\,600\sqrt{3}\sum_{k=0}^{\infty}\frac{(4-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}\right)^2$$

for $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$

$$\Bigg(\frac{1}{27}\Bigg(\Bigg(\Bigg(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18432\sqrt{3}}\right)}{50\,\Gamma(4)} - 4\pi - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\Bigg)-1\Bigg)\Bigg)^2 =$$

$$\frac{1}{729}\left(-1-4\pi-\frac{-2+\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}+\frac{32\pi^8\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\sqrt{\frac{\pi}{3}}^8}{25\sum_{k=0}^{\infty}\frac{(4-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}\right)^2$$

for $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$

$$\left(\frac{1}{27}\left(\left(\left(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{50\,\Gamma(4)}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)-1\right)\right)^2=$$

$$\frac{1}{729}\left(-1-4\pi+\frac{1}{25\,\Gamma(4)}\,32\pi^8\exp^8\left(i\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,8}\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{\pi}{3}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8-\frac{-2+\exp\left(i\pi\left\lfloor\frac{\arg\left(10-x-2\sqrt{5}\right)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(10-x-2\sqrt{5}\right)^k}{k!}}{-1+\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)^2$$

for $(x\in\mathbb{R}$ and $x<0)$

Integral representations

$$\left(\frac{1}{27}\left(\left(\left(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{50\,\Gamma(4)}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)-1\right)\right)^2=$$

$$\frac{1}{729}\left(-1-4\pi+\frac{7\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{129\,600\sqrt{3}\int_0^1\log^3\left(\frac{1}{t}\right)dt}+\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}\right)^2$$

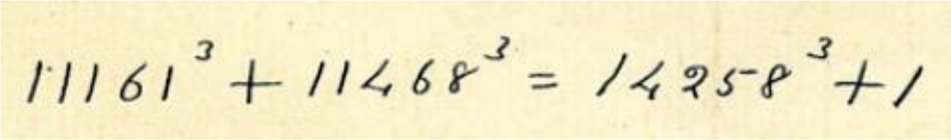
$$\left(\frac{1}{27}\left(\left(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8}4^{3}\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18432\sqrt{3}}\right)}{50\,\Gamma(4)}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)-1\right)\right)^{2}=$$

$$\frac{1}{729}\left(-1-4\pi+\frac{7\pi^{8}\left(-765+17399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{129\,600\sqrt{3}\int_{0}^{\infty}e^{-t}t^{3}\,dt}+\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}\right)^{2}$$

$$\left(\frac{1}{27}\left(\left(\frac{\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^{8}4^{3}\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18432\sqrt{3}}\right)}{50\,\Gamma(4)}-4\pi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)-1\right)\right)^{2}=$$

$$\frac{1}{729}\left(-1-4\pi+\frac{7e^{-\int_{0}^{1}\left(-3+x+x^{2}+x^{3}\right)/\log(x)\,dx}\pi^{8}\left(-765+17399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{129\,600\sqrt{3}}+\frac{2-\sqrt{10-2\sqrt{5}}}{-1+\sqrt{5}}\right)^{2}$$

From the following Ramanujan taxicab number:



$11161^3 + 11468^3 = 14258^3 + 1$

where 14258 = (11161^3 + 11468^3 – 1)^(1/3)

$$\sqrt[3]{11161^3 + 11468^3 - 1}$$

14258

and

c = 299792458 = speed of light in m/s

we obtain, from the previous expression:

((299792458((((Pi*sqrt(1/3*Pi))^8) * 4^3)) / ((gamma(4))) * (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3)))) / (((11161^3 + 11468^3 – 1)^(1/3) + (e^(2Pi))))

Input

$$\frac{299\,792\,458\times\frac{\left(\pi\sqrt{\frac{1}{3}\pi}\right)^8\times4^3}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)}{\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}}$$

$\Gamma(x)$ is the gamma function

Exact result

$$\frac{9\,593\,358\,656\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{12}}{243\left(14\,258+e^{2\pi}\right)}$$

Decimal approximation

$1.76495100507970074256813362962994415705426487695285595570432\ldots\times10^9$

1.764951005…*10^9

With regard the Vacuum Energy and the Cosmological Constant, we have the following formula:

$$\Lambda_c = 4\pi\,\rho_p t_p^{\,2}/t_u^{\,2} \sim 10^{-121}\rho_p$$

from which we obtain:

5.66301×10^{-10} J/m^3 (joules per cubic meter)

$5.66301*10^{-10} = \Lambda$

From:

$\lambda_c = \frac{\sqrt{\alpha}}{\Lambda}$ we obtain: $1.76506*10^{9} = \lambda_c$ (connected to a soliton/instanton-like solution)

Alternate forms

$$\frac{\left(18\,256\,311\,418\,597 - 267\,564\,768\,765\sqrt{3}\right)\pi^{12}}{629\,856\left(14\,258 + e^{2\pi}\right)}$$

$$-\frac{1\,049\,273\,603\left(255\sqrt{3} - 17\,399\right)\pi^{12}}{629\,856\left(14\,258 + e^{2\pi}\right)}$$

$$\frac{1\,049\,273\,603\left(17\,399\sqrt{3} - 765\right)\pi^{12}}{629\,856\sqrt{3}\left(14\,258 + e^{2\pi}\right)}$$

Expanded forms

$$\frac{18\,256\,311\,418\,597\,\pi^{12}}{8\,980\,486\,848 + 629\,856\,e^{2\pi}} - \frac{89\,188\,256\,255\,\pi^{12}}{997\,831\,872\sqrt{3} + 69\,984\sqrt{3}\,e^{2\pi}}$$

$$\frac{18\,256\,311\,418\,597\,\pi^{12}}{629\,856\left(14\,258 + e^{2\pi}\right)} - \frac{89\,188\,256\,255\,\pi^{12}}{69\,984\sqrt{3}\left(14\,258 + e^{2\pi}\right)}$$

Alternative representations

$$\frac{299\,792\,458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}\right)\Gamma(4)}=$$

$$\frac{299\,792\,458\times 4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{6\left(e^{2\pi}+\sqrt[3]{-1+11\,161^3+11\,468^3}\right)}$$

$$\frac{299\,792\,458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}\right)\Gamma(4)}=$$

$$\frac{299\,792\,458\times 4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{3!\left(e^{2\pi}+\sqrt[3]{-1+11\,161^3+11\,468^3}\right)}$$

$$\frac{299\,792\,458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}\right)\Gamma(4)}=$$

$$\frac{299\,792\,458\times 4^3\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8}{\Gamma(4,0)\left(e^{2\pi}+\sqrt[3]{-1+11\,161^3+11\,468^3}\right)}$$

Series representations

$$\frac{299\,792\,458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}\right)\Gamma(4)}=$$

$$\frac{1\,049\,273\,603\,\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{1296\left(14\,258+e^{2\pi}\right)\sqrt{3}\,\sum_{k=0}^{\infty}\frac{(4-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}\quad\text{for } (z_0\notin\mathbb{Z}\text{ or } z_0>0)$$

$$\frac{299\,792\,458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}\right)\Gamma(4)}=$$

$$\left(1\,049\,273\,603\,\pi^7\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}\sum_{k=0}^{\infty}(4-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\Big/\left(1296\left(14\,258+e^{2\pi}\right)\sqrt{3}\right)$$

$$\frac{299\,792\,458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}\right)\Gamma(4)}=$$

$$\left(1\,049\,273\,603\,\pi^8\exp^8\left(i\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^{\,7}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k(\pi-3x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8\left(-765+17\,399\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(1296\left(14\,258+e^{2\pi}\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\Gamma(4)\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for ($x \in \mathbb{R}$ and $x < 0$)

Integral representations

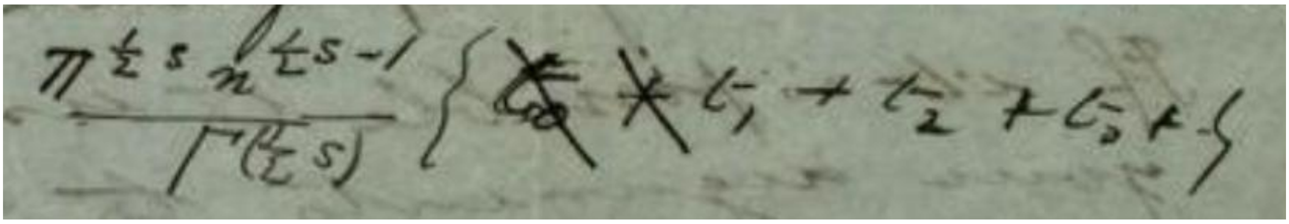
$$\frac{299\,792\,458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11\,161^3+11\,468^3-1}+e^{2\pi}\right)\Gamma(4)}=$$

$$\frac{1\,049\,273\,603\,\pi^8\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{1296\left(14\,258+e^{2\pi}\right)\sqrt{3}\int_0^{\infty}t^3\,\mathcal{A}^{-t}\,dt}$$

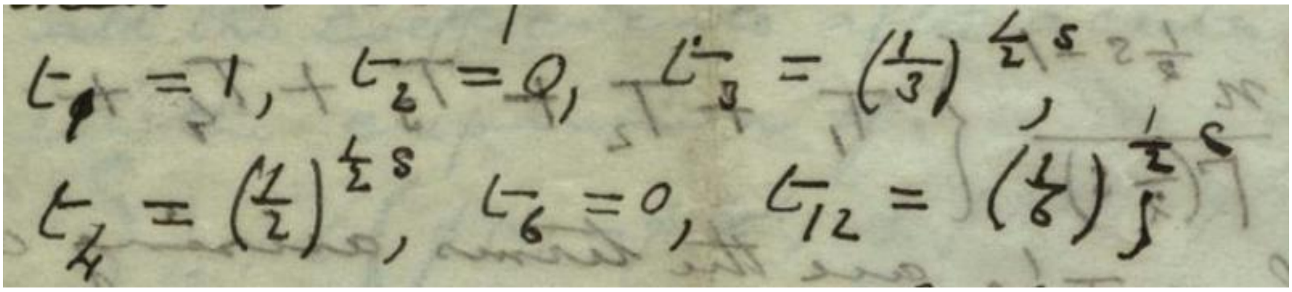
$$\frac{299792458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11161^3+11468^3-1}+e^{2\pi}\right)\Gamma(4)} = \frac{1049273603\,\pi^8\left(-765+17399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{1296\left(14258+e^{2\pi}\right)\sqrt{3}\,\int_0^1\log^3\left(\frac{1}{t}\right)dt}$$

$$\frac{299792458\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18432\sqrt{3}}\right)\right)}{\left(\sqrt[3]{11161^3+11468^3-1}+e^{2\pi}\right)\Gamma(4)} = \frac{1049273603\,\pi^8\,\mathcal{A}^{-\int_0^1\left(-3+x+x^2+x^3\right)/\log(x)\,dx}\left(-765+17399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{1296\left(14258+e^{2\pi}\right)\sqrt{3}}$$

We have:



$$\frac{\pi^{\frac{1}{2}s}\,n^{\frac{1}{2}s-1}}{\Gamma(\frac{1}{2}s)}\left\{ c_1 + c_2 + c_3 + \text{\&c} \right\}$$



$c_1 = 1,\ c_2 = 0,\ c_3 = \left(\frac{1}{3}\right)^{\frac{1}{2}s},$

$c_4 = \left(\frac{1}{2}\right)^{\frac{1}{2}s},\ c_6 = 0,\ c_{12} = \left(\frac{1}{6}\right)^{\frac{1}{2}s}$

(Pi^4 * 4^3) / (gamma(4)) * (((1 + (1/3)^4 + (1/2)^4 + (1/6)^4)))

Input

$$\frac{\pi^4 \times 4^3}{\Gamma(4)}\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)$$

$\Gamma(x)$ is the gamma function

Exact result

$$\frac{2788\,\pi^4}{243}$$

Decimal approximation

1117.5989539209826955357845577617689307170391310923743031926435883
…

1117.59895….. result very near to the Lambda baryon mass 1115.683

Property

$\frac{2788\,\pi^4}{243}$ is a transcendental number

Alternative representations

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{1}{6}\times 4^3\,\pi^4\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)$$

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{4^3\,\pi^4\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)}{3!}$$

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{4^3\,\pi^4\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)}{\Gamma(4,0)}$$

Series representations

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{27\,880}{27}\sum_{k=1}^{\infty}\frac{1}{k^4}$$

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{89\,216}{81}\sum_{k=0}^{\infty}\frac{1}{(1+2\,k)^4}$$

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{713\,728}{243}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)^4$$

Integral representations

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{713\,728}{243}\left(\int_0^1\sqrt{1-t^2}\,dt\right)^4$$

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{44\,608}{243}\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4$$

$$\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)} = \frac{44\,608}{243}\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^4$$

From which:

((((Pi^4 * 4^3) / (gamma(4)) * (((1 + (1/3)^4 + (1/2)^4 + (1/6)^4))))))^1/14

Input

$$\sqrt[14]{\frac{\pi^4 \times 4^3}{\Gamma(4)}\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)}$$

$\Gamma(x)$ is the gamma function

Exact result

$$\frac{\sqrt[7]{2}\ \sqrt[14]{697}\ \pi^{2/7}}{3^{5/14}}$$

Decimal approximation

1.6509530135394754117174984447561984138982057361160622141856926475 …

1.65095301353…. result very near to the 14th root of the following Ramanujan’s class invariant $Q=\left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

Property

$\frac{\sqrt[7]{2}\ \sqrt[14]{697}\ \pi^{2/7}}{3^{5/14}}$ is a transcendental number

Alternate form

$\pi^{2/7}$ (root of $243x^{14}-2788$ near $x=1.1904$)

All 14th roots of (2788 π^4)/243

$$\frac{\sqrt[7]{2}\ \sqrt[14]{697}\ \pi^{2/7}\ e^{0}}{3^{5/14}} \approx 1.6510 \text{ (real, principal root)}$$

$$\frac{\sqrt[7]{2}\ \sqrt[14]{697}\ \pi^{2/7}\ e^{(i\pi)/7}}{3^{5/14}} \approx 1.4875 + 0.7163\, i$$

$$\frac{\sqrt[7]{2}\ \sqrt[14]{697}\ \pi^{2/7}\ e^{(2 i\pi)/7}}{3^{5/14}} \approx 1.0294 + 1.2908\, i$$

$$\frac{\sqrt[7]{2}\ \sqrt[14]{697}\ \pi^{2/7}\ e^{(3 i\pi)/7}}{3^{5/14}} \approx 0.3674 + 1.6096\, i$$

$$\frac{\sqrt[7]{2}\ \sqrt[14]{697}\ \pi^{2/7}\ e^{(4 i\pi)/7}}{3^{5/14}} \approx -0.3674 + 1.6096\, i$$

Alternative representations

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\, 4^3\right)}{\Gamma(4)}} = \sqrt[14]{\frac{1}{6}\times 4^3\, \pi^4 \left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)}$$

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\, 4^3\right)}{\Gamma(4)}} = \sqrt[14]{\frac{4^3\, \pi^4 \left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)}{3!}}$$

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)}} = \sqrt[14]{\frac{4^3\,\pi^4\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)}{\Gamma(4,\,0)}}$$

Series representations

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)}} = \frac{2^{5/7}\,\sqrt[14]{697}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{2/7}}{3^{5/14}}$$

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)}} = \frac{2^{5/7}\,\sqrt[14]{697}\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^{2/7}}{3^{5/14}}$$

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)}} = \frac{\sqrt[7]{2}\,\sqrt[14]{697}\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{2/7}}{3^{5/14}}$$

Integral representations

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)}} = \frac{2^{5/7}\,\sqrt[14]{697}\left(\int_0^1\sqrt{1-t^2}\,dt\right)^{2/7}}{3^{5/14}}$$

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)}}=\frac{2^{3/7}\sqrt[14]{697}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^{2/7}}{3^{5/14}}$$

$$\sqrt[14]{\frac{\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\left(\pi^4\,4^3\right)}{\Gamma(4)}}=\frac{2^{3/7}\sqrt[14]{697}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^{2/7}}{3^{5/14}}$$

From:

((((Pi*sqrt(1/3*Pi))^8) * 4^3)) / ((gamma(4))) * (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3))

$$\frac{\left(\pi\sqrt{\frac{1}{3}\pi}\right)^8\times 4^3}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20736}-\frac{595}{18432\sqrt{3}}\right)$$

= 87092.87798713….

And:

(Pi^4 * 4^3) / (gamma(4)) * (((1 + (1/3)^4 + (1/2)^4 + (1/6)^4)))

$$\frac{\pi^4\times 4^3}{\Gamma(4)}\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)$$

$$\frac{2788\,\pi^4}{243}$$

= 1117.59895…

we obtain, after some calculations:

(((((((Pi*sqrt(1/3*Pi))^8) * 4^3)) / ((gamma(4))) * (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3))))((((Pi^4 * 4^3) / (gamma(4)) * (((1 + (1/3)^4 + (1/2)^4 + (1/6)^4)))))) * Pi

Input

$$\left(\frac{\left(\pi\sqrt{\frac{1}{3}\pi}\right)^8\times 4^3}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)$$

$$\left(\frac{\pi^4\times 4^3}{\Gamma(4)}\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi$$

$\Gamma(x)$ is the gamma function

Exact result

$$\frac{89\,216\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{17}}{59\,049}$$

Decimal approximation

$3.05786636096456448165444731128780364012133675544889086746764\ldots\times 10^8$

$3.05786636 * 10^8 \approx 3 * 10^8 = c$

Property

$\frac{89\,216\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{17}}{59\,049}$ is a transcendental number

Alternate forms

$$\frac{\left(84\,889\,721-1\,244\,145\sqrt{3}\right)\pi^{17}}{76\,527\,504}$$

$$-\frac{4879\left(255\sqrt{3}-17\,399\right)\pi^{17}}{76\,527\,504}$$

$$\left(\frac{84\,889\,721}{76\,527\,504}-\frac{414\,715}{8\,503\,056\sqrt{3}}\right)\pi^{17}$$

Expanded form

$$\frac{84\,889\,721\,\pi^{17}}{76\,527\,504}-\frac{414\,715\,\pi^{17}}{8\,503\,056\sqrt{3}}$$

Alternative representations

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)=$$
$$\pi\left(4^3\right)^2\left(\frac{1}{6}\right)^2\pi^4\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)$$
$$\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8$$

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)=$$
$$\pi\left(4^3\right)^2\pi^4\left(\frac{1}{3!}\right)^2\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)$$
$$\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8$$

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)=$$
$$\pi\left(4^3\right)^2\pi^4\left(\frac{1}{\Gamma(4,0)}\right)^2\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)$$
$$\left(1-\frac{1}{81}+\frac{1}{256}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\left(\pi\sqrt{\frac{\pi}{3}}\right)^8$$

Series representations

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)=$$
$$\frac{4879\,\pi^{13}\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{26\,244\sqrt{3}\left(\sum_{k=0}^{\infty}\frac{(4-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2}\quad \text{for } (z_0\notin\mathbb{Z}\text{ or } z_0>0)$$

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)\right)=$$
$$\frac{1}{26\,244\sqrt{3}}4879\,\pi^{11}\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}$$
$$\left(\sum_{k=0}^{\infty}(4-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi\left(-j+k+2z_0\right)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^2$$

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)=$$
$$\left(4879\,\pi^{13}\exp^8\left(i\,\pi\left\lfloor\frac{\arg\left(\frac{\pi}{3}-x\right)}{2\,\pi}\right\rfloor\right)\sqrt{x}^{\,7}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k(\pi-3\,x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^8\right.$$
$$\left.\left(-765+17\,399\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\,(3-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg/$$
$$\left(26\,244\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\,\pi}\right\rfloor\right)\Gamma(4)^2\sum_{k=0}^{\infty}\frac{(-1)^k\,(3-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for $(x\in\mathbb{R}$ and $x<0)$

Integral representations

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)=$$
$$\frac{4879\,\pi^{13}\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{26\,244\left(\int_0^\infty e^{-t}\,t^3\,dt\right)^2\sqrt{3}}$$

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$
$$\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)=$$
$$\frac{4879\,e^{-2\int_0^1\left(-3+x+x^2+x^3\right)/\log(x)\,dx}\,\pi^{13}\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{\,8}}{26\,244\sqrt{3}}$$

$$\frac{1}{\Gamma(4)\,\Gamma(4)}\left(\left(\left(\pi^4\,4^3\right)\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi\right)$$

$$\left(\left(\left(\pi\sqrt{\frac{\pi}{3}}\right)^8 4^3\right)\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)=$$

$$\frac{4879\,\pi^{13}\left(-765+17\,399\sqrt{3}\right)\sqrt{\frac{\pi}{3}}^{8}}{26\,244\left(\int_0^1\log^3\left(\frac{1}{t}\right)dt\right)^2\sqrt{3}}$$

Or:

(89216 (121793/165888 - 595/(18432 sqrt(3))) π^16)/59049 * (((3277481218394976/(697 (17399 - 255 sqrt(3)) π^16))))

where

$$\frac{3\,277\,481\,218\,394\,976}{697\left(17\,399-255\sqrt{3}\right)\pi^{16}}$$

3.0800096291890919965630796950258204241305205049767430049378233957
...

Input

$$\frac{89\,216\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{16}}{59\,049}\times\frac{3\,277\,481\,218\,394\,976}{697\left(17\,399-255\sqrt{3}\right)\pi^{16}}$$

Result

299 792 458

299792458 = c

Decimal approximation

$2.99792458000000000000000000000000000000000000000000000000000\ldots\times 10^8$

Series representations

$$\frac{3277481218394976\left(89216\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\pi^{16}\right)}{\left(697\left(17399-255\sqrt{3}\right)\pi^{16}\right)59049} = -\frac{299792458\left(-765+17399\sqrt{2}\,\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}{\sqrt{2}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)\left(-17399+255\sqrt{2}\,\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{3277481218394976\left(89216\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\pi^{16}\right)}{\left(697\left(17399-255\sqrt{3}\right)\pi^{16}\right)59049} = -\frac{299792458\left(-765+17399\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)\left(-17399+255\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)}$$

$$\frac{3277481218394976\left(89216\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\pi^{16}\right)}{\left(697\left(17399-255\sqrt{3}\right)\pi^{16}\right)59049} = -\left(\left(599584916\sqrt{\pi}\left(1530\sqrt{\pi}-17399\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\right)\Big/\left(\left(34798\sqrt{\pi}-255\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\right)$$

Similarly:

(89216 (121793/165888 - 595/(18432 sqrt(3))) π^16)/59049 * ((11/25 e^3 sqrt(log(π)/(3 π)))) where

$$\frac{11}{25} e^3 \sqrt{\frac{\log(\pi)}{3\pi}}$$

$\log(x)$ is the natural logarithm

3.0800095926632236028122272453272804830302527918015295956571502423
…

Input

$$\frac{89216\left(\frac{121793}{165888} - \frac{595}{18432\sqrt{3}}\right)\pi^{16}}{59049}\left(\frac{11}{25} e^3 \sqrt{\frac{\log(\pi)}{3\pi}}\right)$$

$\log(x)$ is the natural logarithm

Exact result

$$\frac{981376\left(\frac{121793}{165888} - \frac{595}{18432\sqrt{3}}\right) e^3 \pi^{31/2} \sqrt{\frac{\log(\pi)}{3}}}{1476225}$$

Decimal approximation

$2.9979245444475791160755099355852520189559184330248485440980 6\ldots \times 10^8$

$2.997924544\ldots * 10^8 \approx c$

Alternate forms

$$\frac{53669\left(17399\sqrt{3} - 765\right) e^3 \pi^{31/2} \sqrt{\log(\pi)}}{5739562800}$$

$$\frac{\left(933786931 - 13685595\sqrt{3}\right) e^3 \pi^{31/2} \sqrt{\frac{\log(\pi)}{3}}}{1913187600}$$

$$-\frac{53\,669\left(255\sqrt{3}-17\,399\right)e^{3}\,\pi^{31/2}\sqrt{\frac{\log(\pi)}{3}}}{1\,913\,187\,600}$$

Expanded form

$$\frac{933\,786\,931\,e^{3}\,\pi^{31/2}\sqrt{\frac{\log(\pi)}{3}}}{1\,913\,187\,600}-\frac{912\,373\,e^{3}\,\pi^{31/2}\sqrt{\log(\pi)}}{127\,545\,840}$$

Alternative representations

$$\frac{\left(11\,e^{3}\sqrt{\frac{\log(\pi)}{3\,\pi}}\right)\left(89\,216\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{16}\right)}{25\times59\,049}=\frac{981\,376\,e^{3}\,\pi^{16}\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\sqrt{\frac{\log_{e}(\pi)}{3\,\pi}}}{25\times59\,049}$$

$$\frac{\left(11\,e^{3}\sqrt{\frac{\log(\pi)}{3\,\pi}}\right)\left(89\,216\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{16}\right)}{25\times59\,049}=\frac{981\,376\,e^{3}\,\pi^{16}\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\sqrt{\frac{\log(a)\log_{a}(\pi)}{3\,\pi}}}{25\times59\,049}$$

$$\frac{\left(11\,e^{3}\sqrt{\frac{\log(\pi)}{3\,\pi}}\right)\left(89\,216\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{16}\right)}{25\times59\,049}=\frac{981\,376\,e^{3}\,\pi^{16}\left(\frac{121793}{165888}-\frac{595}{18432\sqrt{3}}\right)\sqrt{-\frac{\mathrm{Li}_{1}(1-\pi)}{3\,\pi}}}{25\times59\,049}$$

Series representations

$$\frac{\left(11 e^3 \sqrt{\frac{\log(\pi)}{3\pi}}\right)\left(89216\left(\frac{121793}{165888} - \frac{595}{18432\sqrt{3}}\right)\pi^{16}\right)}{25\times 59049} = -\frac{53669\left(-17399+255\sqrt{3}\right) e^3 \pi^{31/2}\sqrt{\log(-1+\pi) - \sum_{k=1}^{\infty}\frac{\left(\frac{1}{1-\pi}\right)^k}{k}}}{1913187600\sqrt{3}}$$

$$\frac{\left(11 e^3 \sqrt{\frac{\log(\pi)}{3\pi}}\right)\left(89216\left(\frac{121793}{165888} - \frac{595}{18432\sqrt{3}}\right)\pi^{16}\right)}{25\times 59049} = -\frac{1}{1913187600\sqrt{3}}\,53669\left(-17399+255\sqrt{3}\right) e^3 \pi^{31/2} \sqrt{2 i \pi \left\lfloor \frac{\arg(\pi - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (\pi - x)^k x^{-k}}{k}} \quad \text{for } x < 0$$

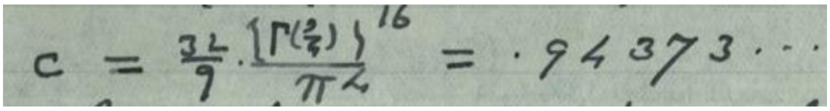
$$\frac{\left(11 e^3 \sqrt{\frac{\log(\pi)}{3\pi}}\right)\left(89216\left(\frac{121793}{165888} - \frac{595}{18432\sqrt{3}}\right)\pi^{16}\right)}{25\times 59049} = \frac{1}{1476225\sqrt{3}}\,981376\left(\frac{121793}{165888} - \frac{595}{18432\sqrt{3}}\right) e^3 \pi^{31/2} \sqrt{2 i \pi \left\lfloor \frac{\arg(\pi - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (\pi - x)^k x^{-k}}{k}} \quad \text{for } x < 0$$

Integral representations

$$\frac{\left(11 e^3 \sqrt{\frac{\log(\pi)}{3 \pi}}\right)\left(89216\left(\frac{121793}{165888}-\frac{595}{18432 \sqrt{3}}\right) \pi^{16}\right)}{25 \times 59049}=\frac{53669\left(-765+17399 \sqrt{3}\right) e^3 \pi^{31/2} \sqrt{\int_1^\pi \frac{1}{t}\, dt}}{5739562800}$$

$$\frac{\left(11 e^3 \sqrt{\frac{\log(\pi)}{3 \pi}}\right)\left(89216\left(\frac{121793}{165888}-\frac{595}{18432 \sqrt{3}}\right) \pi^{16}\right)}{25 \times 59049}=-\frac{53669\left(-17399+255 \sqrt{3}\right) e^3 \pi^{15} \sqrt{-i \int_{-i \infty+\gamma}^{i \infty+\gamma} \frac{(-1+\pi)^{-s}\, \Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds}}{1913187600 \sqrt{6}} \text{ for } -1<\gamma<0$$

Now, we have:



$$c = \frac{32}{9} \cdot \frac{\{\Gamma(\frac{3}{4})\}^{16}}{\pi^4} = \cdot 94373 \cdots$$

32/9* (((gamma(3/4))^16)) / (Pi^4)

Input

$$\frac{32}{9} \times \frac{\Gamma\left(\frac{3}{4}\right)^{16}}{\pi^4}$$

$\Gamma(x)$ is the gamma function

Exact result

$$\frac{32\, \Gamma\left(\frac{3}{4}\right)^{16}}{9 \pi^4}$$

Decimal approximation

0.9437320532407425020137639122926103734583730853285379679591843383

…

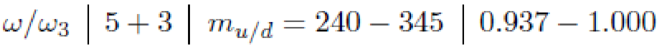
0.94373205324…. result near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}-\varphi+1}}=1-\frac{e^{-\pi}}{1+\frac{e^{-2\pi}}{1+\frac{e^{-3\pi}}{1+\frac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

From:

The primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation. (Astronomy & Astrophysics manuscript no. ms c ESO 2019 - September 24, 2019 - **Planck 2018 results. VI. Cosmological parameters**)

We know that α’ is the Regge slope (string tension). With regard the Omega mesons, in this case, the value is in the below range:



ω/ω_3	$5+3$	$m_{u/d} = 240 - 345$	$0.937 - 1.000$

Alternate forms

$$\frac{137\,438\,953\,472\left(\frac{3}{4}!\right)^{16}}{387\,420\,489\,\pi^4}$$

$$\frac{8192\,\pi^{12}}{9\,\Gamma\left(\frac{1}{4}\right)^{16}}$$

$$\frac{\left(4+2\sqrt{2}\right)^8\pi^8}{18\,432\left(2+\sqrt{2}\right)^8 K\left(\frac{\left(-2-2\sqrt{2}\right)^2}{\left(4+2\sqrt{2}\right)^2}\right)^8}$$

$n!$ is the factorial function

$K(m)$ is the complete elliptic integral of the first kind with parameter $m = k^2$

Alternative representations

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16}32}{\pi^4\,9} = \frac{32\left(\left(-1+\frac{3}{4}\right)!\right)^{16}}{9\,\pi^4}$$

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16}32}{\pi^4\,9} = \frac{32\left(\frac{G\left(1+\frac{3}{4}\right)}{G\left(\frac{3}{4}\right)}\right)^{16}}{9\,\pi^4}$$

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16}32}{\pi^4\,9} = \frac{32\,\Gamma\left(\frac{3}{4},0\right)^{16}}{9\,\pi^4}$$

Series representations

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16} 32}{\pi^4 9} = \frac{137\,438\,953\,472 \left(\sum_{k=0}^{\infty} \frac{\left(\frac{3}{4}\right)^k \Gamma^{(k)}(1)}{k!}\right)^{16}}{387\,420\,489\,\pi^4}$$

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16} 32}{\pi^4 9} = \frac{32}{9\,\pi^4 \left(\sum_{k=1}^{\infty} \left(\frac{3}{4}\right)^k c_k\right)^{16}}$$

$$\text{for}\left(c_1 = 1 \text{ and } c_2 = 1 \text{ and } c_k = \frac{\gamma\, c_{-1+k} + \sum_{j=1}^{-2+k} (-1)^{1+j+k} c_j\, \zeta(-j+k)}{-1+k}\right)$$

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16} 32}{\pi^4 9} = \frac{32 \left(\sum_{k=0}^{\infty} \frac{\left(\frac{3}{4}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}\right)^{16}}{9\,\pi^4} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16} 32}{\pi^4 9} = \frac{32\,\pi^{12}}{9\left(\sum_{k=0}^{\infty} \left(\frac{3}{4} - z_0\right)^k \sum_{j=0}^{k} \frac{(-1)^j \pi^{-j+k} \sin\left(\frac{1}{2}(-j+k)\pi + \pi z_0\right) \Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^{16}}$$

$\zeta(s)$ is the Riemann zeta function

γ is the Euler-Mascheroni constant

$\mathbb{Z}$ is the set of integers

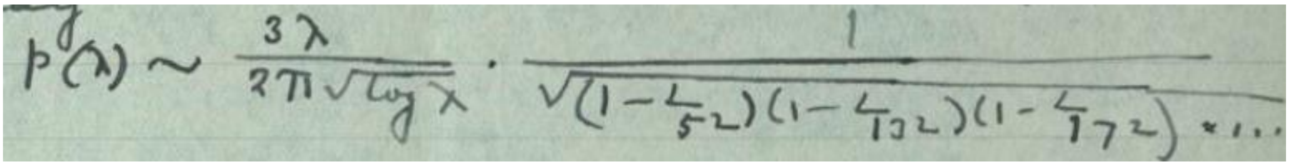
Integral representations

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16} 32}{\pi^4 9} = \frac{32 \left(\int_0^1 \frac{1}{\sqrt[4]{\log\left(\frac{1}{t}\right)}}\, dt\right)^{16}}{9\,\pi^4}$$

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16}\,32}{\pi^4\,9} = \frac{32\exp\left(-12\,\gamma + 16\int_0^1 \frac{-1+x^{3/4}-\frac{3\log(x)}{4}}{(-1+x)\log(x)}\,dx\right)}{9\,\pi^4}$$

$$\frac{\Gamma\left(\frac{3}{4}\right)^{16}\,32}{\pi^4\,9} = \frac{32\exp\left(16\int_0^1 \frac{-\frac{1}{4}+x^{3/4}-\frac{3x}{4}}{(-1+x)\log(x)}\,dx\right)}{9\,\pi^4}$$

Now, we have that:



$$p(\lambda) \sim \frac{3\lambda}{2\pi\sqrt{\log\lambda}} \cdot \frac{1}{\sqrt{\left(1-\frac{4}{5^2}\right)\left(1-\frac{4}{13^2}\right)\left(1-\frac{4}{17^2}\right)\cdots}}$$

For λ = 10 :

(3*10) / (2Pi*sqrt(ln(10))) 1/(sqrt((1-1/5^2)(1-1/13^2)(1-1/17^2)))

Input

$$\frac{3\times 10}{2\,\pi\,\sqrt{\log(10)}} \times \frac{1}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}$$

log(x) is the natural logarithm

Exact result

$$\frac{5525}{96\,\pi\,\sqrt{14\log(10)}}$$

Decimal approximation

3.2265567973645845029382025756695603715544741309263868695220307093

…

3.226556797364…..

Alternate form

$$\frac{5525}{96\,\pi\sqrt{14\,(\log(2)+\log(5))}}$$

Alternative representations

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\,\pi\sqrt{\log(10)}\right)} = \frac{30}{\left(2\,\pi\sqrt{\log_e(10)}\right)\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}$$

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\,\pi\sqrt{\log(10)}\right)} = \frac{30}{\left(2\,\pi\sqrt{\log(a)\log_a(10)}\right)\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}$$

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\,\pi\sqrt{\log(10)}\right)} = \frac{30}{\left(2\,\pi\sqrt{-\mathrm{Li}_1(-9)}\right)\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}$$

Series representations

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)} = \frac{5525}{96\sqrt{14}\,\pi\sqrt{\log(9)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{9}\right)^k}{k}}}$$

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)} = \frac{5525}{96\sqrt{14}\,\pi\sqrt{2i\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(10-x)^k x^{-k}}{k}}} \quad \text{for } x<0$$

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)} = \frac{5525}{96\sqrt{14}\,\pi\sqrt{\log(z_0)+\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(10-z_0)^k z_0^{-k}}{k}}}$$

Integral representations

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)} = \frac{5525}{96\sqrt{14}\,\pi\sqrt{\int_1^{10}\frac{1}{t}\,dt}}$$

$$\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)} = \frac{5525}{96\sqrt{7\pi}\,\sqrt{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}} \quad \text{for } -1<\gamma<0$$

From which:

sqrt((((3*10) / (2Pi*sqrt(ln(10))) 1/(sqrt((1-1/5^2)(1-1/13^2)(1-1/17^2))) - Pi/5)))

Input

$$\sqrt{\frac{3\times 10}{2\pi\sqrt{\log(10)}}\times\frac{1}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}-\frac{\pi}{5}}$$

$\log(x)$ is the natural logarithm

Exact result

$$\sqrt{\frac{5525}{96\pi\sqrt{14\log(10)}}-\frac{\pi}{5}}$$

Decimal approximation

1.6119051667659068134840448337121268192540803690291435345646884331...

1.6119051667559…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternate forms

$$\frac{1}{8}\sqrt{\frac{27625\sqrt{14\log(10)}-1344\pi^2\log(10)}{105\pi\log(10)}}$$

$$\frac{\sqrt{27625-96\pi^2\sqrt{14\log(10)}}}{4\times 2^{3/4}\sqrt{15\pi}\sqrt[4]{7\log(10)}}$$

$$\sqrt{\frac{5525}{96\,\pi\,\sqrt{14\,(\log(2)+\log(5))}}-\frac{\pi}{5}}$$

All 2^{nd} roots of 5525/(96 π sqrt(14 log(10)))-π/5

$$e^{0}\sqrt{\frac{5525}{96\,\pi\,\sqrt{14\log(10)}}-\frac{\pi}{5}}\approx 1.6119 \quad \text{(real, principal root)}$$

$$e^{i\,\pi}\sqrt{\frac{5525}{96\,\pi\,\sqrt{14\log(10)}}-\frac{\pi}{5}}\approx -1.6119 \quad \text{(real root)}$$

Alternative representations

$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\,\left(2\,\pi\,\sqrt{\log(10)}\right)}-\frac{\pi}{5}} = \sqrt{-\frac{\pi}{5}+\frac{30}{\left(2\,\pi\,\sqrt{\log_e(10)}\right)\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}}$$

$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\,\left(2\,\pi\,\sqrt{\log(10)}\right)}-\frac{\pi}{5}} = \sqrt{-\frac{\pi}{5}+\frac{30}{\left(2\,\pi\,\sqrt{\log(a)\log_a(10)}\right)\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}}$$

$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)}-\frac{\pi}{5}} = \sqrt{-\frac{\pi}{5}+\frac{30}{\left(2\pi\sqrt{-\text{Li}_1(-9)}\right)\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}}}$$

Series representations

$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)}-\frac{\pi}{5}} = \sqrt{-\frac{\pi}{5}+\frac{5525}{96\sqrt{14}\,\pi\sqrt{\log(9)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{9}\right)^k}{k}}}}$$

$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)}-\frac{\pi}{5}} = \sqrt{-\frac{\pi}{5}+\frac{5525}{96\sqrt{14}\,\pi\sqrt{2\,i\,\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-x)^k\,x^{-k}}{k}}}} \quad \text{for } x<0$$

$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)}-\frac{\pi}{5}} =$$

$$\frac{\sqrt{-4032\pi^2+27625\sqrt{14}\sum_{k=0}^{\infty}9^k\binom{\frac{1}{2}+k}{k}\sum_{j=0}^{k}\frac{(-1)^j\binom{k}{j}p_{j,k}}{1+2j}}}{24\sqrt{35\pi}}$$

$$\text{for}\left(c_k=\frac{14(-1)^k}{1+k}\text{ and }p_{j,0}=1\text{ and } 14\,p_{j,k}=\frac{\sum_{m=1}^{k}(-k+m+jm)\,c_m\,p_{j,k-m}}{k}\text{ and }k\in\mathbb{Z}\text{ and }k>0\right)$$

Integral representations

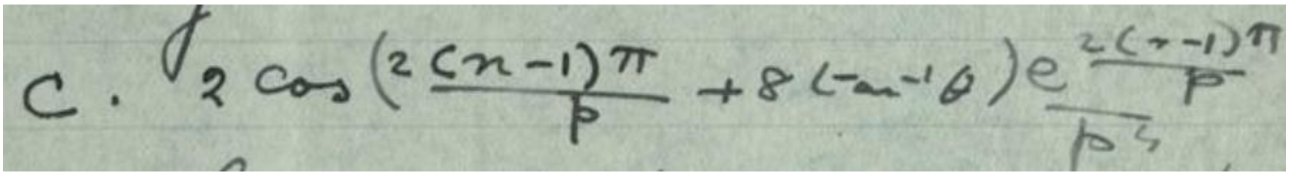
$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)}-\frac{\pi}{5}} =$$

$$\sqrt{-\frac{\pi}{5}+\frac{5525}{96\sqrt{14}\,\pi\sqrt{\int_1^{10}\frac{1}{t}\,dt}}}$$

$$\sqrt{\frac{3\times 10}{\sqrt{\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)}\left(2\pi\sqrt{\log(10)}\right)}-\frac{\pi}{5}} =$$

$$\sqrt{-\frac{\pi}{5}+\frac{5525}{96\sqrt{7\pi}\sqrt{-i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}}}\quad\text{for } -1<\gamma<0$$

Now, we have that:



$$c.\ \int 2\cos\left(\frac{2(n-1)\pi}{p} + 8\tan^{-1}\theta\right)\frac{e^{\frac{2(r-1)\pi}{p}}}{p^4}$$

For θ = π/6 :

0.94373205324 * ((2 cos(1/5*2(3-1)Pi+8*tan^-1(Pi/6))*1/5^4*exp(1/5*2(3-1)Pi)))

Input interpretation

$$0.94373205324\left(2\cos\left(\frac{1}{5}\times 2\,(3-1)\,\pi + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\times\frac{1}{5^4}\exp\left(\frac{1}{5}\times 2\,(3-1)\,\pi\right)\right)$$

$\tan^{-1}(x)$ is the inverse tangent function

Result

0.037134914010…

(result in radians)

0.037134914010…

Addition formulas

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}\,(3-1)\,\pi + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}\,(3-1)\,\pi\right)\right)}{5^4} =$$

$$0.00301994257036800\exp\left(\frac{4\pi}{5}\right)\left(\cos\left(\frac{4\pi}{5}\right)\cos\left(-8\tan^{-1}\left(\frac{\pi}{6}\right)\right) + \sin\left(\frac{4\pi}{5}\right)\sin\left(-8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\right)$$

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}=$$

$$0.00301994257036800\exp\left(\frac{4\pi}{5}\right)\left(\cos\left(\frac{4\pi}{5}\right)\cos\left(8\tan^{-1}\left(\frac{\pi}{6}\right)\right)-1.00000000000000\sin\left(\frac{4\pi}{5}\right)\sin\left(8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\right)$$

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}=$$

$$0.00301994257036800\exp\left(\frac{4\pi}{5}\right)\left(\cosh\left(8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\cos\left(\frac{4\pi}{5}\right)+i\sinh\left(8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\sin\left(\frac{4\pi}{5}\right)\right)$$

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}=$$

$$0.00301994257036800\exp\left(\frac{4\pi}{5}\right)\left(\cosh\left(-8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\cos\left(\frac{4\pi}{5}\right)-1.00000000000000\,i\sinh\left(-8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\sin\left(\frac{4\pi}{5}\right)\right)$$

Alternative representations

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}=$$

$$\frac{1.88746410648000\cosh\left(i\left(8\tan^{-1}\left(\frac{\pi}{6}\right)+\frac{4\pi}{5}\right)\right)\exp\left(\frac{4\pi}{5}\right)}{5^4}$$

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}=$$

$$\frac{1.88746410648000\cosh\left(-i\left(8\tan^{-1}\left(\frac{\pi}{6}\right)+\frac{4\pi}{5}\right)\right)\exp\left(\frac{4\pi}{5}\right)}{5^4}$$

$$\frac{0.943732053240000 \times 2\left(\cos\left(\frac{2}{5}(3-1)\pi + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4} = \frac{0.943732053240000\exp\left(\frac{4\pi}{5}\right)\left(e^{-i\left(8\tan^{-1}(\pi/6)+(4\pi)/5\right)} + e^{i\left(8\tan^{-1}(\pi/6)+(4\pi)/5\right)}\right)}{5^4}$$

Series representations

$$\frac{0.943732053240000 \times 2\left(\cos\left(\frac{2}{5}(3-1)\pi + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4} = 0.00301994257036800\exp\left(\frac{4\pi}{5}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{4\pi}{5} + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)^{2k}}{(2k)!}$$

$$\frac{0.943732053240000 \times 2\left(\cos\left(\frac{2}{5}(3-1)\pi + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4} = 0.00301994257036800\, J_0\left(\frac{4\pi}{5} + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{4\pi}{5}\right) + 0.00603988514073600\exp\left(\frac{4\pi}{5}\right)\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{4\pi}{5} + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)$$

$n!$ is the factorial function

$J_n(z)$ is the Bessel function of the first kind

Integral representations

$$\frac{0.943732053240000 \times 2\left(\cos\left(\frac{2}{5}(3-1)\pi + 8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4} = -0.00301994257036800\exp\left(\frac{4\pi}{5}\right)\int_{\frac{\pi}{2}}^{\frac{4\pi}{5}+8\tan^{-1}\left(\frac{\pi}{6}\right)}\sin(t)\,dt$$

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4} = 0.00301994257036800\exp\left(\frac{4\pi}{5}\right)\left(1-\frac{4}{5}\left(\pi+10\tan^{-1}\left(\frac{\pi}{6}\right)\right)\int_0^1\sin\left(\frac{4\pi t}{5}+8t\tan^{-1}\left(\frac{\pi}{6}\right)\right)dt\right)$$

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4} = \frac{0.00150997128518400\exp\left(\frac{4\pi}{5}\right)\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\frac{4\left(\pi+10\tan^{-1}\left(\frac{\pi}{6}\right)\right)^2}{25s}}}{\sqrt{s}}\,ds \quad \text{for } \gamma>0$$

$$\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4} = \frac{0.00150997128518400\exp\left(\frac{4\pi}{5}\right)\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{25}{4}\right)^s\left(\pi+10\tan^{-1}\left(\frac{\pi}{6}\right)\right)^{-2s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds \quad \text{for } 0<\gamma<\frac{1}{2}$$

$\Gamma(x)$ is the gamma function

Inverting:

1/(((0.94373205324 * ((2 cos(1/5*2(3-1)Pi+8*tan^-1(Pi/6))*1/5^4*exp(1/5*2(3-1)Pi))))))

Input interpretation

$$\frac{1}{0.94373205324\left(2\cos\left(\frac{1}{5}\times 2(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\times\frac{1}{5^4}\exp\left(\frac{1}{5}\times 2(3-1)\pi\right)\right)}$$

$\tan^{-1}(x)$ is the inverse tangent function

Result

26.928835751…

(result in radians)

26.928835751…..

Addition formulas

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} = \frac{331.132124766910}{\exp\left(\frac{4\pi}{5}\right)\left(\cos\left(\frac{4\pi}{5}\right)\cos\left(-8\tan^{-1}\left(\frac{\pi}{6}\right)\right)+\sin\left(\frac{4\pi}{5}\right)\sin\left(-8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\right)}$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} = \frac{331.132124766910}{\exp\left(\frac{4\pi}{5}\right)\left(\cos\left(\frac{4\pi}{5}\right)\cos\left(8\tan^{-1}\left(\frac{\pi}{6}\right)\right)-1.00000000000000\sin\left(\frac{4\pi}{5}\right)\sin\left(8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\right)}$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} = \frac{331.132124766910}{\exp\left(\frac{4\pi}{5}\right)\left(\cosh\left(8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\cos\left(\frac{4\pi}{5}\right)+i\sinh\left(8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\sin\left(\frac{4\pi}{5}\right)\right)}$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} = 331.132124766910\Bigg/\left(\exp\left(\frac{4\pi}{5}\right)\left(\cosh\left(-8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\cos\left(\frac{4\pi}{5}\right)-1.00000000000000\,i\sinh\left(-8\,i\tan^{-1}\left(\frac{\pi}{6}\right)\right)\sin\left(\frac{4\pi}{5}\right)\right)\right)$$

Alternative representations

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}}=$$

$$\frac{1}{\frac{1.88746410648000\cosh\left(i\left(8\tan^{-1}\left(\frac{\pi}{6}\right)+\frac{4\pi}{5}\right)\right)\exp\left(\frac{4\pi}{5}\right)}{5^4}}$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}}=$$

$$\frac{1}{\frac{1.88746410648000\cosh\left(-i\left(8\tan^{-1}\left(\frac{\pi}{6}\right)+\frac{4\pi}{5}\right)\right)\exp\left(\frac{4\pi}{5}\right)}{5^4}}$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}}=$$

$$\frac{1}{\frac{0.943732053240000\exp\left(\frac{4\pi}{5}\right)\left(e^{-i\left(8\tan^{-1}(\pi/6)+(4\pi)/5\right)}+e^{i\left(8\tan^{-1}(\pi/6)+(4\pi)/5\right)}\right)}{5^4}}$$

Series representations

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}}=$$

$$\frac{331.132124766910}{\exp\left(\frac{4\pi}{5}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{4\pi}{5}+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)^{2k}}{(2k)!}}$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} =$$

$$\frac{331.132124766910}{\exp\left(\frac{4\pi}{5}\right)\left(J_0\left(\frac{4\pi}{5}+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{4\pi}{5}+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\right)}$$

$n!$ is the factorial function

$J_n(z)$ is the Bessel function of the first kind

Integral representations

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} =$$

$$-\frac{331.132124766910}{\exp\left(\frac{4\pi}{5}\right)\int_{\frac{\pi}{2}}^{\frac{4\pi}{5}+8\tan^{-1}\left(\frac{\pi}{6}\right)}\sin(t)\,dt}$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} =$$

$$\frac{662.264249533820\,i\,\pi}{\exp\left(\frac{4\pi}{5}\right)\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{s-\frac{4\left(\pi+10\tan^{-1}\left(\frac{\pi}{6}\right)\right)^2}{25\,s}}}{\sqrt{s}}\,ds} \quad \text{for } \gamma > 0$$

$$\frac{1}{\frac{0.943732053240000\times 2\left(\cos\left(\frac{2}{5}(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\exp\left(\frac{2}{5}(3-1)\pi\right)\right)}{5^4}} =$$

$$\frac{662.264249533820\,i\,\pi}{\exp\left(\frac{4\pi}{5}\right)\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\left(\frac{25}{4}\right)^s\left(\pi+10\tan^{-1}\left(\frac{\pi}{6}\right)\right)^{-2\,s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds} \quad \text{for } 0 < \gamma < \frac{1}{2}$$

From which:

64/(((0.94373205324 ((2 cos(1/5*2(3-1)Pi+8*tan^-1(Pi/6))*1/5^4*exp(1/5*2(3-1)Pi))))))+4+Φ

Input interpretation

$$\frac{64}{0.94373205324\left(2\cos\left(\frac{1}{5}\times 2\,(3-1)\,\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\times\frac{1}{5^4}\exp\left(\frac{1}{5}\times 2\,(3-1)\,\pi\right)\right)}+4+\Phi$$

$\tan^{-1}(x)$ is the inverse tangent function

Φ is the golden ratio conjugate

Result

1728.0635221…

(result in radians)

1728.0635221….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = 8^2 * 3^3) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Or:

((10^3+[1/(((0.943732 ((2 cos(1/5*2(3-1)Pi+8*tan^-1(Pi/6))*1/5^4*exp(1/5*2(3-1)Pi))))))]^2+e+Φ-1/2))

Input interpretation

$$10^3+\left(\frac{1}{0.943732\left(2\cos\left(\frac{1}{5}\times 2\,(3-1)\,\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\times\frac{1}{5^4}\exp\left(\frac{1}{5}\times 2\,(3-1)\,\pi\right)\right)}\right)^2+e+\Phi-\frac{1}{2}$$

$\tan^{-1}(x)$ is the inverse tangent function

Φ is the golden ratio conjugate

Result

1728.00…

(result in radians)

1728

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = 8^2 * 3^3) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

((10^3+[1/(((0.943732 ((2 cos(1/5*2(3-1)Pi+8*tan^-1(Pi/6))*1/5^4*exp(1/5*2(3-1)Pi))))))]^2+e+Φ-1/2))^1/15

Input interpretation

$$\left(10^3+\left(\frac{1}{0.943732\left(2\cos\left(\frac{1}{5}\times 2(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\times\frac{1}{5^4}\exp\left(\frac{1}{5}\times 2(3-1)\pi\right)\right)}\right)^2+e+\Phi-\frac{1}{2}\right){}^\wedge(1/15)$$

$\tan^{-1}(x)$ is the inverse tangent function

Φ is the golden ratio conjugate

Result

1.643752…

(result in radians)

$1.643752\ldots.. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$ (trace of the instanton shape)

(1/27((10^3+[1/(((0.943732 ((2 cos(1/5*2(3-1)Pi+8*tan^-1(Pi/6))*1/5^4*exp(1/5*2(3-1)Pi))))))]^2+e+Φ-1/2)))^2

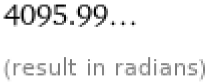
Input interpretation

$$\left(\frac{1}{27}\left(10^3+\left(1\Big/\left(0.943732\left(2\cos\left(\frac{1}{5}\times 2(3-1)\pi+8\tan^{-1}\left(\frac{\pi}{6}\right)\right)\times\frac{1}{5^4}\exp\left(\frac{1}{5}\times 2(3-1)\pi\right)\right)\right)\right)^2+e+\Phi-\frac{1}{2}\right)\right)^2$$

$\tan^{-1}(x)$ is the inverse tangent function

Φ is the golden ratio conjugate

Result



4095.99…

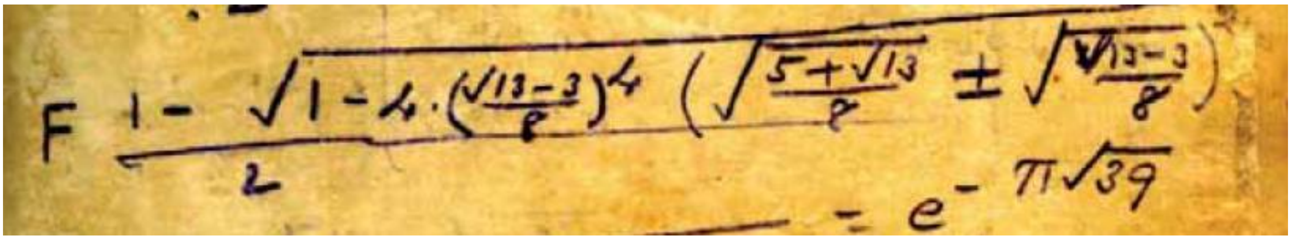
(result in radians)

4095.99 ≈ 4096 = 64^2

From:

Manuscript Book 1 – *Srinivasa Ramanujan*

Now, we have that:

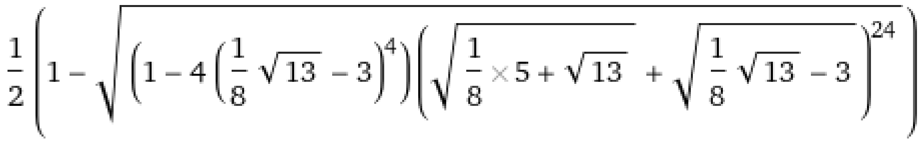


$$F\ \frac{1-\sqrt{1-4\cdot\left(\frac{\sqrt{13}-3}{8}\right)^4\left(\sqrt{\frac{5+\sqrt{13}}{8}}\pm\sqrt{\frac{\sqrt{13}-3}{8}}\right)}}{2} = e^{-\pi\sqrt{39}}$$

From:

1/2*(((1-sqrt[(1-4(1/8*sqrt13-3)^4 (((1/8*5+sqrt13)^0.5+(1/8*sqrt13-3)^0.5))^24])))

Input



$$\frac{1}{2}\left(1-\sqrt{\left(1-4\left(\frac{1}{8}\sqrt{13}-3\right)^4\right)\left(\sqrt{\frac{1}{8}\times 5+\sqrt{13}}+\sqrt{\frac{1}{8}\sqrt{13}-3}\right)^{24}}\right)$$

Exact result

$$\frac{1}{2}\left(1-\sqrt{\left(1-4\left(\frac{\sqrt{13}}{8}-3\right)^4\right)\left(\sqrt{\frac{5}{8}+\sqrt{13}}+i\sqrt{3-\frac{\sqrt{13}}{8}}\right)^{24}}\right)$$

Decimal approximation

$-627906.555277530258542010496891534066866896471714508894190952502\ldots$
$-$
$42290.964045391782366387917000935763786902352492003401414054 8469\ldots\, i$

Polar forms

$629329\,(\cos(-3.0743)+i\sin(-3.0743))$

(solution)

Approximate form

$$
\begin{aligned}
&\frac{1}{262\,144}\sqrt{\Bigg(13\,608\,373\,519\,646\,786\,260\,513 +} \\
&\quad 3\,774\,283\,730\,822\,062\,692\,096\sqrt{13} - 14\,461\,771\,448\,320 \\
&\qquad \sqrt{4\,886\,037 - 735\,072\sqrt{13}}\,\cos\Bigg(\frac{1}{2}\tan^{-1}\Bigg(\Bigg(20\sqrt{16 + 187\sqrt{13}} \\
&\qquad\qquad \left(45\,744\,371\,180\,361\,710\sqrt{13} - 164\,974\,063\,980\,289\,993\right)\Bigg)\Big/ \\
&\qquad\qquad \Big(84\,563\,213\,677\,928\,001\,849 - \\
&\qquad\qquad\quad 23\,497\,112\,146\,734\,031\,960\sqrt{13}\Big)\Bigg)\Bigg) - \\
&\quad 52\,142\,670\,086\,144\sqrt{375\,849 - 56\,544\sqrt{13}} \\
&\qquad \cos\Bigg(\frac{1}{2}\tan^{-1}\Bigg(\Bigg(20\sqrt{16 + 187\sqrt{13}} \\
&\qquad\qquad \left(45\,744\,371\,180\,361\,710\sqrt{13} - 164\,974\,063\,980\,289\,993\right)\Bigg)\Big/ \\
&\qquad\qquad \Big(84\,563\,213\,677\,928\,001\,849 - \\
&\qquad\qquad\quad 23\,497\,112\,146\,734\,031\,960\sqrt{13}\Big)\Bigg)\Bigg)\exp\Bigg(i\Bigg(-\pi + \\
&\qquad \tan^{-1}\left(\frac{\operatorname{Im}\left(-\sqrt{\left(1 - 4\left(\frac{\sqrt{13}}{8} - 3\right)^4\right)\left(\sqrt{\frac{5}{8} + \sqrt{13}} + i\sqrt{3 - \frac{\sqrt{13}}{8}}\right)^{24}}\right)}{1 + \operatorname{Re}\left(-\sqrt{\left(1 - 4\left(\frac{\sqrt{13}}{8} - 3\right)^4\right)\left(\sqrt{\frac{5}{8} + \sqrt{13}} + i\sqrt{3 - \frac{\sqrt{13}}{8}}\right)^{24}}\right)}\right)\Bigg)\Bigg)\Bigg)
\end{aligned}
$$

$\tan^{-1}(x)$ is the inverse tangent function

$\operatorname{Im}(z)$ is the imaginary part of z

$\operatorname{Re}(z)$ is the real part of z

Alternate forms

$$\frac{1}{262\,144}\left(131\,072-\sqrt{\left(3\left(-16\,351\,689\,505\,853\,213\,302\,615\,307+4\,537\,636\,152\,480\,866\,704\,894\,632\sqrt{13}+20\,i\sqrt{\left(13\left(28\,537\,701\,216\,451\,992\,826\,618\,970\,559\,377\,825\,924\,539\,170\,907\sqrt{13}-102\,894\,144\,735\,172\,451\,812\,951\,162\,320\,077\,795\,969\,788\,006\,436\right)\right)}\right)\right)}\right)$$

$$\frac{1}{2}-\frac{1}{262\,144}\left(\sqrt{\left(3\left(-16\,351\,689\,505\,853\,213\,302\,615\,307+4\,537\,636\,152\,480\,866\,704\,894\,632\sqrt{13}+637\,538\,289\,234\,792\,376\,481\,180\,i\sqrt{16+187\sqrt{13}}-176\,808\,464\,249\,795\,238\,039\,880\,i\sqrt{13\left(16+187\sqrt{13}\right)}\right)\right)}\right)$$

$$\frac{1}{262\,144}\left(131\,072-\sqrt{\left(3\left(-16\,351\,689\,505\,853\,213\,302\,615\,307+4\,537\,636\,152\,480\,866\,704\,894\,632\sqrt{13}+637\,538\,289\,234\,792\,376\,481\,180\,i\sqrt{16+187\sqrt{13}}-176\,808\,464\,249\,795\,238\,039\,880\,i\sqrt{13\left(16+187\sqrt{13}\right)}\right)\right)}\right)$$

$$\frac{1}{2}+\frac{1}{2}\,i\sqrt{4\left(3-\frac{\sqrt{13}}{8}\right)^{4}-1}\left(\sqrt{\frac{5}{8}+\sqrt{13}}+i\sqrt{3-\frac{\sqrt{13}}{8}}\right)^{12}$$

$$\frac{1}{2}+\frac{1}{2}\,i\sqrt{4\left(\frac{\sqrt{13}}{8}-3\right)^{4}-1}\left(\sqrt{\frac{5}{8}+\sqrt{13}}+i\sqrt{3-\frac{\sqrt{13}}{8}}\right)^{12}$$

Minimal polynomial

$$22\,300\,745\,198\,530\,623\,141\,535\,718\,272\,648\,361\,505\,980\,416\,x^8 - 89\,202\,980\,794\,122\,492\,566\,142\,873\,090\,593\,446\,023\,921\,664\,x^7 + 63\,677\,119\,539\,734\,066\,626\,158\,194\,088\,129\,309\,722\,032\,997\,011\,850\,858\,070\,016\,x^6 - 191\,031\,358\,619\,201\,887\,668\,041\,802\,835\,663\,947\,666\,043\,173\,958\,491\,490\,484\,224\,x^5 - 49\,994\,074\,540\,318\,992\,051\,302\,663\,259\,989\,652\,304\,045\,717\,522\,221\,310\,062\,052\,264\,965\,570\,560\,x^4 + 99\,988\,149\,080\,956\,369\,700\,303\,996\,228\,689\,230\,019\,674\,633\,630\,052\,673\,475\,009\,662\,054\,039\,552\,x^3 + 9\,991\,151\,139\,724\,897\,073\,413\,014\,036\,713\,024\,043\,018\,663\,814\,542\,484\,936\,768\,295\,337\,689\,665\,081\,603\,784\,704\,x^2 - 9\,991\,151\,139\,774\,891\,147\,953\,524\,060\,122\,945\,908\,099\,419\,273\,053\,774\,448\,813\,575\,536\,107\,730\,753\,541\,898\,240\,x + 2\,497\,787\,784\,946\,847\,417\,600\,096\,069\,269\,286\,802\,665\,345\,586\,875\,606\,460\,076\,303\,015\,142\,412\,287\,233\,577\,089$$

Expanded form

$$\frac{1}{2} - \frac{1}{2}\sqrt{\left(1 - 4\left(\frac{\sqrt{13}}{8} - 3\right)^4\right)\left(\sqrt{\frac{5}{8} + \sqrt{13}} + i\sqrt{3 - \frac{\sqrt{13}}{8}}\right)^{24}}$$

From:

exp(-Pi*sqrt39)

Input

$\exp\left(-\pi\sqrt{39}\right)$

Exact result

$e^{-\sqrt{39}\,\pi}$

Decimal approximation

$3.0162851863840317684184216439662214956341718861269946755834\ldots \times 10^{-9}$

3.016285186384….*10^{-9}

Property

$e^{-\sqrt{39}\,\pi}$ is a transcendental number

Series representations

$$e^{-\pi\sqrt{39}} = e^{-\pi\sqrt{38}\sum_{k=0}^{\infty} 38^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{39}} = \exp\left(-\pi\sqrt{38}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{38}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{39}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 38^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

From

$3.0162851863840317684184216439662214956341718861269946755834\ldots \times 10^{-9}$

and:

$629329(\cos(-3.0743) + i\sin(-3.0743))$

we obtain:

3.016285186384 × 10^-9/((629329 (cos(-3.0743)+i sin(-3.0743))))

Input interpretation

$$\frac{3.016285186384 \times 10^{-9}}{629329 (\cos(-3.0743) + i \sin(-3.0743))}$$

i is the imaginary unit

Result

$$-4.78201\ldots \times 10^{-15} + 3.22281\ldots \times 10^{-16}\, i$$

Polar coordinates

$r = 4.79286 \times 10^{-15}$ (radius), $\theta = 3.0743$ (angle)

$4.79286 * 10^{-15}$

From

$r = 4.79286 \times 10^{-15}$ (radius), $\theta = 3.0743$ (angle)

and

$$\frac{1}{2}\left(1 - \sqrt{\left(1 - 4\left(\frac{1}{8}\sqrt{13} - 3\right)^4\right)\left(\sqrt{\frac{1}{8} \times 5 + \sqrt{13}} + \sqrt{\frac{1}{8}\sqrt{13} - 3}\right)^{24}}\right)$$

we obtain:

((4.79286×10^-15))*((1/2*(((1-sqrt[(1-4(1/8*sqrt13-3)^4)(((1/8*5+sqrt13)^0.5+(1/8*sqrt13-3)^0.5))^24])))))

Input interpretation

$$4.79286\times 10^{-15}\left(\frac{1}{2}\left(1-\sqrt{\left(1-4\left(\frac{1}{8}\sqrt{13}-3\right)^4\right)\left(\sqrt{\frac{1}{8}\times 5+\sqrt{13}}+\sqrt{\frac{1}{8}\sqrt{13}-3}\right)^{24}}\right)\right)$$

Result

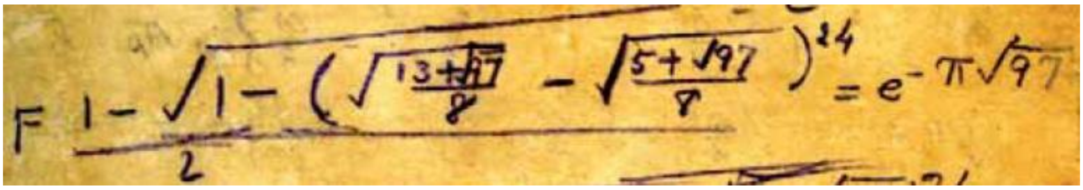
$$-3.00947\ldots\times 10^{-9}-2.02695\ldots\times 10^{-10}\,i$$

Polar coordinates

$r = 3.01629\times 10^{-9}$ (radius), $\theta = -3.07434$ (angle)

$3.01629*10^{-9}$

From:



$$F\ \frac{1-\sqrt{1-\left(\sqrt{\frac{13+\sqrt{97}}{8}}-\sqrt{\frac{5+\sqrt{97}}{8}}\right)^{24}}}{2}=e^{-\pi\sqrt{97}}$$

1/2*((1-sqrt[1-((1/8*13+sqrt97)^0.5-(1/8*5+sqrt97)^0.5))^24])))

Input

$$\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{1}{8}\times 13+\sqrt{97}}-\sqrt{\frac{1}{8}\times 5+\sqrt{97}}\right)^{24}}\right)$$

Exact result

$$\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{13}{8}+\sqrt{97}}-\sqrt{\frac{5}{8}+\sqrt{97}}\right)^{24}}\right)$$

Decimal approximation

$4.916035713796087208096134498045878446733287498392479257 6987\ldots \times 10^{-21}$

4.916035713796…*10^{-21}

Alternate forms

$$\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{5}{8}+\sqrt{97}}-\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}\right)$$

$$\frac{1}{256}\left(128-3\sqrt{\left(2\left(-12\,306\,662\,905\,879\,069\,171\,785-1\,100\,386\,494\,859\,131\,713\,376\sqrt{97}+364\,227\,217\,806\,575\,507\,259\sqrt{697+16\sqrt{97}}+43\,404\,205\,368\,970\,731\,400\sqrt{97\left(697+16\sqrt{97}\right)}\right)\right)}\right)$$

$$\frac{1}{256}\left(128-\sqrt{\left(6\left(-36\,919\,988\,717\,637\,207\,515\,355-3\,301\,159\,484\,577\,395\,140\,128\sqrt{97}+364\,227\,217\,806\,575\,507\,259\sqrt{\left(5+8\sqrt{97}\right)\left(13+8\sqrt{97}\right)}+43\,404\,205\,368\,970\,731\,400\sqrt{97\left(5+8\sqrt{97}\right)\left(13+8\sqrt{97}\right)}\right)\right)}\right)$$

$$\frac{1}{2}-\frac{1}{2}\sqrt{1-\left(\sqrt{\frac{5}{8}+\sqrt{97}}-\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}$$

Minimal polynomial

$$268\,435\,456\,x^8 - 1\,073\,741\,824\,x^7 + 3\,629\,382\,570\,898\,608\,049\,468\,506\,112\,x^6 - 10\,888\,147\,712\,695\,824\,144\,647\,421\,952\,x^5 + 2\,754\,118\,210\,290\,977\,351\,505\,291\,661\,607\,873\,404\,921\,868\,833\,x^4 - 5\,508\,236\,420\,581\,954\,684\,863\,670\,468\,722\,706\,570\,017\,399\,874\,x^3 + 2\,754\,118\,210\,290\,977\,340\,843\,980\,359\,593\,212\,264\,070\,871\,585\,x^2 - 226\,836\,410\,681\,163\,002\,991\,118\,336\,x + 1\,048\,576$$

Expanded form

$$\frac{1}{2} - \frac{1}{2}\sqrt{1 - \left(\sqrt{\frac{13}{8} + \sqrt{97}} - \sqrt{\frac{5}{8} + \sqrt{97}}\right)^{24}}$$

From:

exp(-Pi*sqrt97)

Input

$\exp(-\pi\sqrt{97})$

Exact result

$e^{-\sqrt{97}\,\pi}$

Decimal approximation

$3.6513318284368187990221937042668025448939449764200692761112\ldots \times 10^{-14}$

$3.6513318284368\ldots*10^{-14}$

Property

$e^{-\sqrt{97}\,\pi}$ is a transcendental number

Series representations

$$e^{-\pi\sqrt{97}} = e^{-\pi\sqrt{96}\sum_{k=0}^{\infty} 96^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{97}} = \exp\left(-\pi\sqrt{96}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{96}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{97}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 96^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

1/2*((1-sqrt[1-((1/8*13+sqrt97)^0.5-(1/8*5+sqrt97)^0.5))^24])))* x = exp(-Pi*sqrt97)

Input

$$\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{1}{8}\times 13+\sqrt{97}}-\sqrt{\frac{1}{8}\times 5+\sqrt{97}}\right)^{24}}\right)x = \exp\left(-\pi\sqrt{97}\right)$$

Exact result

$$\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{13}{8}+\sqrt{97}}-\sqrt{\frac{5}{8}+\sqrt{97}}\right)^{24}}\right)x = e^{-\sqrt{97}\,\pi}$$

Solution

$x \approx 7427391$

7427391

Or:

exp(-Pi*sqrt97)/(((1/2*((1-sqrt[1-((1/8*13+sqrt97)^0.5-(1/8*5+sqrt97)^0.5))^24]))))))

Input

$$\frac{\exp(-\pi\sqrt{97})}{\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{1}{8}\times 13+\sqrt{97}}-\sqrt{\frac{1}{8}\times 5+\sqrt{97}}\right)^{24}}\right)}$$

Exact result

$$\frac{2\,e^{-\sqrt{97}\,\pi}}{1-\sqrt{1-\left(\sqrt{\frac{13}{8}+\sqrt{97}}-\sqrt{\frac{5}{8}+\sqrt{97}}\right)^{24}}}$$

Decimal approximation

$7.42739076974141119484977542089317251627301660315755466899332\ldots \times 10^{6}$

$7.427390769\ldots * 10^{6}$

Property

$$\frac{2\,e^{-\sqrt{97}\,\pi}}{1-\sqrt{1-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}}$$ is a transcendental number

Alternate forms

$$-\left(\left(256\,e^{-\sqrt{97}\,\pi}\right)\Big/\left(3\sqrt{\left(2\left(-12\,306\,662\,905\,879\,069\,171\,785-1\,100\,386\,494\,859\,131\,713\,376\sqrt{97}+364\,227\,217\,806\,575\,507\,259\sqrt{697+16\sqrt{97}}+43\,404\,205\,368\,970\,731\,400\sqrt{97\left(697+16\sqrt{97}\right)}\right)\right)}-128\right)\right)$$

$$e^{-\sqrt{97}\,\pi}\quad \text{root of }\ 1\,048\,576\,x^8-226\,836\,410\,681\,163\,002\,991\,118\,336\,x^7+2\,754\,118\,210\,290\,977\,340\,843\,980\,359\,593\,212\,264\,070\,871\,585\,x^6-5\,508\,236\,420\,581\,954\,684\,863\,670\,468\,722\,706\,570\,017\,399\,874\,x^5+2\,754\,118\,210\,290\,977\,351\,505\,291\,661\,607\,873\,404\,921\,868\,833\,x^4-10\,888\,147\,712\,695\,824\,144\,647\,421\,952\,x^3+3\,629\,382\,570\,898\,608\,049\,468\,506\,112\,x^2-1\,073\,741\,824\,x+268\,435\,456\ \text{ near }\ x=2.03416\times10^{20}$$

$$-\left(\left(256\,e^{-\sqrt{97}\,\pi}\right)\Big/\left(\sqrt{\left(6\left(-36\,919\,988\,717\,637\,207\,515\,355-3\,301\,159\,484\,577\,395\,140\,128\sqrt{97}+364\,227\,217\,806\,575\,507\,259\sqrt{\left(5+8\sqrt{97}\right)\left(13+8\sqrt{97}\right)}+43\,404\,205\,368\,970\,731\,400\sqrt{97\left(5+8\sqrt{97}\right)\left(13+8\sqrt{97}\right)}\right)\right)}-128\right)\right)$$

In conclusion:

((1/2*((1-sqrt[1-((1/8*13+sqrt97)^0.5-(1/8*5+sqrt97)^0.5))^24])))))* (((2e^(-sqrt(97)π))/(1-sqrt(1-(-sqrt(5/8+sqrt(97))+sqrt(13/8+sqrt(97)))^24))))

Input

$$\left(\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{1}{8}\times 13+\sqrt{97}}-\sqrt{\frac{1}{8}\times 5+\sqrt{97}}\right)^{24}}\right)\right)\times \frac{2\,e^{-\sqrt{97}\,\pi}}{1-\sqrt{1-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}}$$

Exact result

$$e^{-\sqrt{97}\,\pi}$$

Decimal approximation

$3.6513318284368187990221937042668025448939449764200692761112\ldots \times 10^{-14}$

$3.651331828436\ldots{*}10^{-14}$

Property

$e^{-\sqrt{97}\,\pi}$ is a transcendental number

Series representations

$$\frac{\left(2\,e^{-\sqrt{97}\,\pi}\right)\left(1-\sqrt{1-\left(\sqrt{\frac{13}{8}+\sqrt{97}}-\sqrt{\frac{5}{8}+\sqrt{97}}\right)^{24}}\right)}{\left(1-\sqrt{1-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}\right)2}=$$

$$\frac{e^{-\pi\sqrt{97}}\left(-1+\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}\right)^k}{k!}\right)}{-1+\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\left(\sqrt{\frac{5}{8}+\sqrt{97}}-\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}\right)^k}{k!}}$$

$$\frac{\left(2\,e^{-\sqrt{97}\,\pi}\right)\left(1-\sqrt{1-\left(\sqrt{\frac{13}{8}+\sqrt{97}}-\sqrt{\frac{5}{8}+\sqrt{97}}\right)^{24}}\right)}{\left(1-\sqrt{1-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}\right)2}=$$

$$\left(\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(97-z_0)^k\,z_0^{-k}}{k!}\right)\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

$$\Bigg/\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\left(\sqrt{\frac{5}{8}+\sqrt{97}}-\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}-z_0\right)^k z_0^{-k}}{k!}\right)$$

for (not ($z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0$))

$$\frac{\left(2\,e^{-\sqrt{97}\,\pi}\right)\left(1-\sqrt{1-\left(\sqrt{\frac{13}{8}+\sqrt{97}}-\sqrt{\frac{5}{8}+\sqrt{97}}\right)^{24}}\right)}{\left(1-\sqrt{1-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}\right)2}=\left(e^{-\pi\sqrt{97}}\left(2\sqrt{\pi}+\right.\right.$$

$$\left.\left.\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(-\left(\sqrt{\frac{5}{8}+\sqrt{97}}-\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}\right)^{-s}\right)\right)\Bigg/$$

$$\left(2\sqrt{\pi}+\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(-\left(\sqrt{\frac{5}{8}+\sqrt{97}}-\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}\right)^{-s}\right)$$

From

$$\left(\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{\frac{1}{8}\times 13+\sqrt{97}}-\sqrt{\frac{1}{8}\times 5+\sqrt{97}}\right)^{24}}\right)\right)\times$$

$$\frac{2\,e^{-\sqrt{97}\,\pi}}{1-\sqrt{1-\left(-\sqrt{\frac{5}{8}+\sqrt{97}}+\sqrt{\frac{13}{8}+\sqrt{97}}\right)^{24}}}$$

$$e^{-\sqrt{97}\,\pi}$$

= 3.651331828436…*10^{-14}

And:

$$\frac{\left(\pi\sqrt{\frac{1}{3}\,\pi}\right)^{8}\times 4^{3}}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\sqrt{3}}\right)$$

$\Gamma(x)$ is the gamma function

$$\frac{32}{243}\left(\frac{121\,793}{165\,888}-\frac{595}{18\,432\sqrt{3}}\right)\pi^{12}$$

= 87092.87798713….

And also:

$$\frac{\pi^{4}\times 4^{3}}{\Gamma(4)}\left(1+\left(\frac{1}{3}\right)^{4}+\left(\frac{1}{2}\right)^{4}+\left(\frac{1}{6}\right)^{4}\right)$$

$$\frac{2788\,\pi^4}{243}$$

= 1117.59895…..

we obtain, after some calculations:

1/((((((((Pi*sqrt(1/3*Pi))^8) 4^3))1/((gamma(4))) (1+1/256-1/81-527/2048-1/20736-595/(18432sqrt3)))))((((Pi^4*4^3)/(gamma(4))*(((1 + (1/3)^4 + (1/2)^4 + (1/6)^4))))) * Pi)/ (3.65133182843*10^-14)

Input interpretation

$$\frac{\frac{1}{\left(\left(\left(\left(\pi\sqrt{\frac{1}{3}\,\pi}\right)^8\times 4^3\right)\times\frac{1}{\Gamma(4)}\left(1+\frac{1}{256}-\frac{1}{81}-\frac{527}{2048}-\frac{1}{20\,736}-\frac{595}{18\,432\,\sqrt{3}}\right)\right)\left(\frac{\pi^4\times 4^3}{\Gamma(4)}\left(1+\left(\frac{1}{3}\right)^4+\left(\frac{1}{2}\right)^4+\left(\frac{1}{6}\right)^4\right)\right)\pi}}{3.65133182843\times 10^{-14}}$$

$\Gamma(x)$ is the gamma function

Result

89563.3224339…

89563.3224339….

From the previous expressions/results, we obtain also:

((((4.79286×10^-15))*((1/2*(((1-sqrt[(1-4(1/8*sqrt13-3)^4)
(((1/8*5+sqrt13)^0.5+(1/8*sqrt13-3)^0.5))^24]))))))) / 3.651331828 × 10^-14

Input interpretation

$$\left(4.79286\times10^{-15}\left(\frac{1}{2}\left(1-\sqrt{\left(1-4\left(\frac{1}{8}\sqrt{13}-3\right)^4\right)\left(\sqrt{\frac{1}{8}\times5+\sqrt{13}}+\sqrt{\frac{1}{8}\sqrt{13}-3}\right)^{24}}\right)\right)\right)\Big/\left(3.651331828\times10^{-14}\right)$$

Result

$-82421.1\ldots-5551.25\ldots i$

Polar coordinates

$r = 82607.8$ (radius), $\theta = -3.07434$ (angle)

82607.8

From

$-82421.1\ldots-5551.25\ldots i$

and

89563.3224339…

we obtain:

((((-82421.1 - 5551.25 i))))-89563.3224339

Input interpretation

$(-82421.1 + i\times(-5551.25)) - 89563.3224339$

i is the imaginary unit

Result

$-1.71984\ldots\times10^5-5551.25\ldots i$

Polar coordinates

$r = 172074.$ (radius), $\theta = -3.10933$ (angle)

172074

From which:

((((((-82421.1 - 5551.25 i))))-89563.3224339))-4372-5*4096+34-3

where 4372 and 4096 are values that we find in Ramanujan's work "Modular equations and approximation to π"

Input interpretation

$((-82421.1 + i \times (-5551.25)) - 89563.3224339) - 4372 - 5 \times 4096 + 34 - 3$

i is the imaginary unit

Result

$-1.96805\ldots \times 10^5 - 5551.25\ldots i$

Polar coordinates

$r = 196884.$ (radius), $\theta = -3.11339$ (angle)

196884

196884/196883 is a fundamental number of the following *j*-invariant

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's *j*-invariant or *j* function, regarded as a function of a complex variable τ, is a modular function of weight zero for SL(2, Z) defined on the upper half plane of complex numbers. Several remarkable properties of *j* have to do with its q expansion (Fourier series expansion), written as a Laurent series in terms of $q = e^{2\pi i\tau}$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that *j* has a simple pole at the cusp, so its q-expansion has no terms below q^{-1}.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of q^n is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\,n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

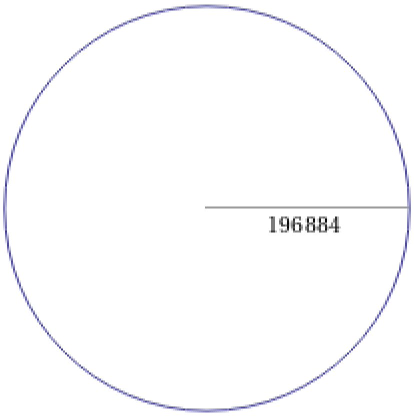
We note that:

r = 196884

Input interpretation

circle	radius 196 884

Visual representation



Equation

$(x - x_0)^2 + (y - y_0)^2 = 38\,763\,309\,456$

(assuming center (x_0, y_0))

Properties

diameter	393 768
area enclosed	$38\,763\,309\,456\,\pi \approx 1.21779\times 10^{11}$
circumference	$393\,768\,\pi \approx 1.23706\times 10^{6}$

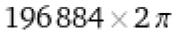
(assuming center (x_0, y_0))

Indeed:

196884*2πr for r = 196884 ; Diameter = 2r = 2*196884 = 393768 (as above)

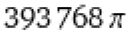
C = 196884*2Pi

Input



$196884 \times 2\pi$

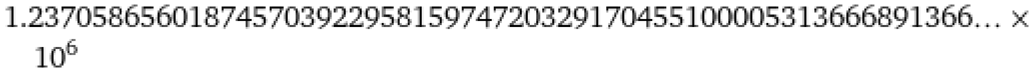
Result



393768π

393768 π = circumference

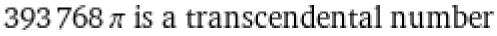
Decimal approximation



$1.2370586560187457039229581597472032917045510000531366689136 6\ldots \times 10^6$

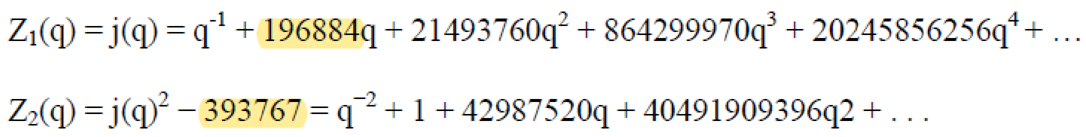
$1.237058656\ldots*10^6 \approx 1.23706 * 10^6$ = Circumference

Property



393768π is a transcendental number

The numbers 196884 and 393768 are in the following j-invariants:

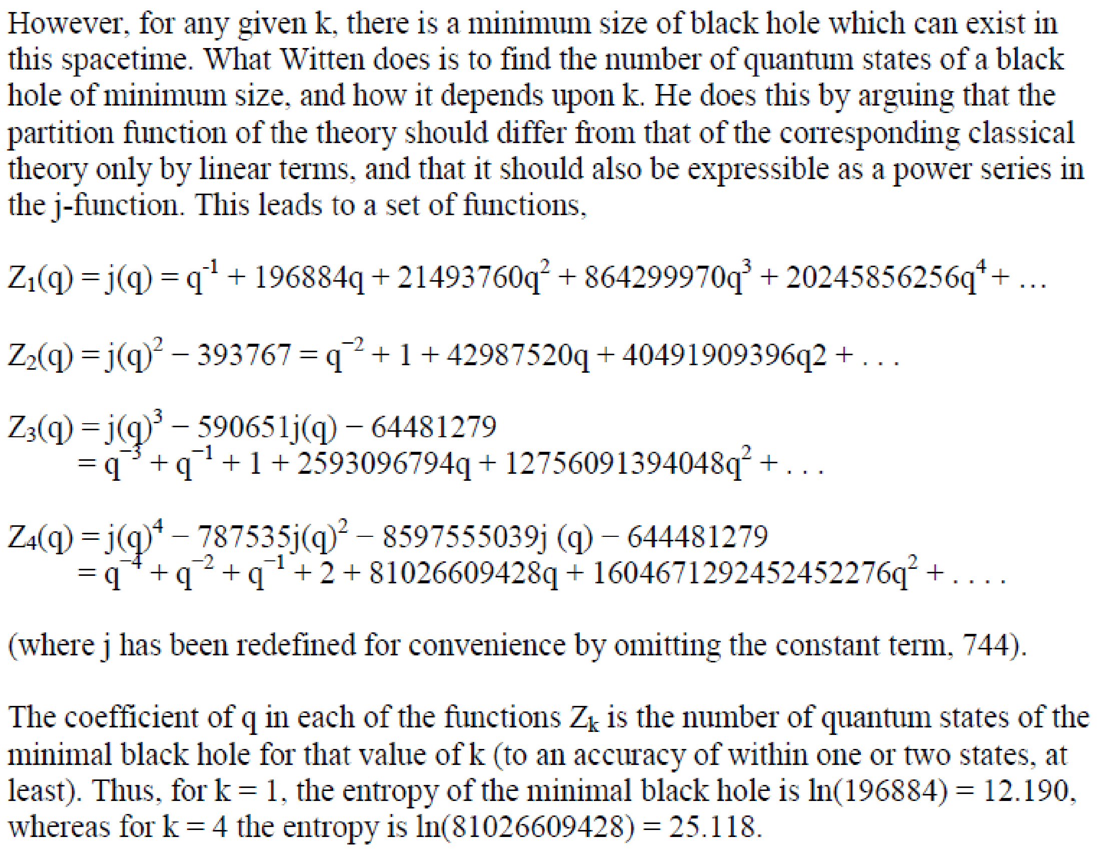


$$Z_1(q) = j(q) = q^{-1} + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \ldots$$

$$Z_2(q) = j(q)^2 - 393767 = q^{-2} + 1 + 42987520q + 40491909396q2 + \ldots$$

We note that

(from: **Monstrous Moonshine and the Entropy of the Smallest Black Hole** - Last Update: 14th September 2008 - http://rickbradford.co.uk/MonstrousMoonshineandtheBlackHole.pdf):



However, for any given k, there is a minimum size of black hole which can exist in this spacetime. What Witten does is to find the number of quantum states of a black hole of minimum size, and how it depends upon k. He does this by arguing that the partition function of the theory should differ from that of the corresponding classical theory only by linear terms, and that it should also be expressible as a power series in the j-function. This leads to a set of functions,

$$Z_1(q) = j(q) = q^{-1} + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \ldots$$

$$Z_2(q) = j(q)^2 - 393767 = q^{-2} + 1 + 42987520q + 40491909396q2 + \ldots$$

$$Z_3(q) = j(q)^3 - 590651j(q) - 64481279$$
$$= q^{-3} + q^{-1} + 1 + 2593096794q + 12756091394048q^2 + \ldots$$

$$Z_4(q) = j(q)^4 - 787535j(q)^2 - 8597555039j\,(q) - 644481279$$
$$= q^{-4} + q^{-2} + q^{-1} + 2 + 81026609428q + 1604671292452452276q^2 + \ldots.$$

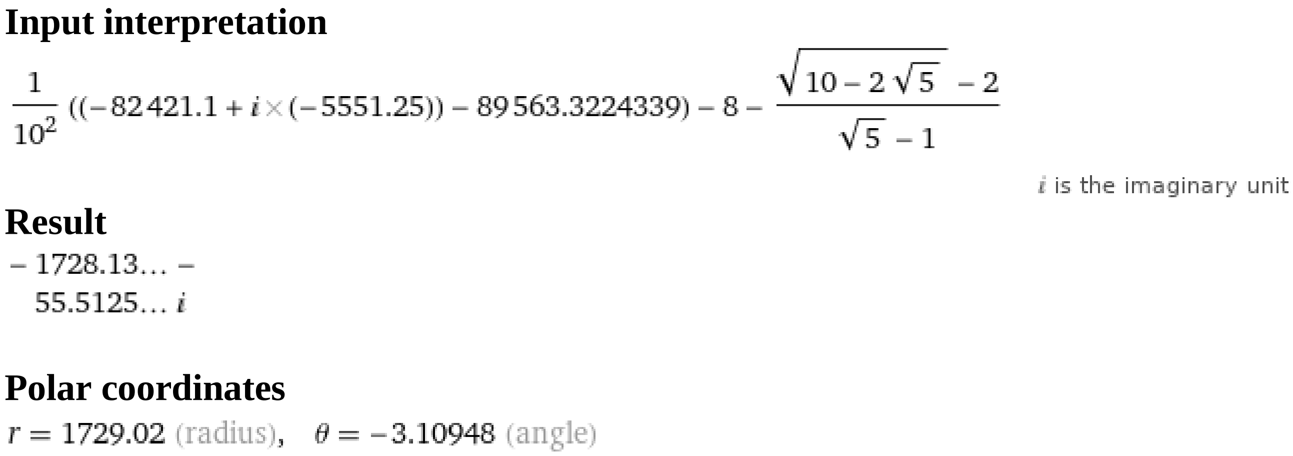
(where j has been redefined for convenience by omitting the constant term, 744).

The coefficient of q in each of the functions Z_k is the number of quantum states of the minimal black hole for that value of k (to an accuracy of within one or two states, at least). Thus, for k = 1, the entropy of the minimal black hole is ln(196884) = 12.190, whereas for k = 4 the entropy is ln(81026609428) = 25.118.

Thence 196884 is the coefficient of q of the functions $Z_1(q)$ that is the number of quantum states of the minimal black hole for the value of k equal to 1.

We have also:

1/10^2[((((-82421.1 - 5551.25 i))))-89563.3224339]-8-(((√(10-2√5) -2))/((√5-1)))



Input interpretation

$$\frac{1}{10^2}\left((-82421.1 + i\times(-5551.25)) - 89563.3224339\right) - 8 - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

i is the imaginary unit

Result

$-1728.13\ldots - 55.5125\ldots\, i$

Polar coordinates

$r = 1729.02$ (radius), $\theta = -3.10948$ (angle)

1729.02

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. ($1728 = 8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(((1/10^2[((((-82421.1 - 5551.25 i))))-89563.3224339]-8-(((√(10-2√5) -2))/((√5-1))))))^1/15

Input interpretation

$$\sqrt[15]{\frac{1}{10^2}((-82421.1+i\times(-5551.25))-89563.3224339)-8-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}}$$

i is the imaginary unit

Result

1.608623... −
0.3383257... i

Polar coordinates

$r = 1.64382$ (radius), $\theta = -0.207299$ (angle)

$1.64382 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ... (trace of the instanton shape)

(1/27((1/10^2[((((-82421.1 - 5551.25 i))))-89563.3224339]-8-(((√(10-2√5) -2))/((√5-1)))+1)))^2

Input interpretation

$$\left(\frac{1}{27}\left(\frac{1}{10^2}((-82421.1+i\times(-5551.25))-89563.3224339)-8-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}+1\right)\right)^2$$

i is the imaginary unit

Result

$4087.64\ldots +$
$263.038\ldots i$

Polar coordinates

$r = 4096.1$ (radius), $\theta = 0.0642609$ (angle)

$4096.1 \approx 4096 = 64^2$

Coefficients of the 3rd order mock theta function f(q).

(From: https://oeis.org/search?q=+mock+theta+functions&sort=&language=&go=Search)

For example:

n = 4096 ; a(n) = -3474457619702701016674823921697877

$$= -3.474457619702701016674823921697877 \times 10^{33}$$

From the following Ramanujan formula

$$a_f(n) \sim \frac{(-1)^{n-1}}{2\sqrt{n-\frac{1}{24}}} \cdot e^{\pi\sqrt{\frac{n}{6}-\frac{1}{144}}}.$$

For n = 4096 , we obtain:

((-1)^4095) / ((2*sqrt(4096-1/24))) * e^(Pi*sqrt(4096/6-1/144))

Input

$$\frac{(-1)^{4095}}{2\sqrt{4096-\frac{1}{24}}}\, e^{\pi\sqrt{4096/6-1/144}}$$

Exact result

$$-\sqrt{\frac{6}{98\,303}}\, e^{\left(\sqrt{98\,303}\,\pi\right)/12}$$

Decimal approximation

$-3.474457619702701019494461189742470106816582749008828842150\ldots \times 10^{33}$

$-3.474457619702170101\ldots.*10^{33}$ value exact up to the 17th decimal digit:

$-3.4744576197027010166748239216978 77*10^{33}$

Property

$-\sqrt{\frac{6}{98\,303}}\, e^{(\sqrt{98\,303}\,\pi)/12}$ is a transcendental number

Series representations

$$\frac{e^{\pi\sqrt{4096/6-1/144}}\,(-1)^{4095}}{2\sqrt{4096-\frac{1}{24}}} = -\frac{e^{\pi\sqrt{98\,159/144}\,\sum_{k=0}^{\infty}(98\,159/144)^{-k}\binom{1/2}{k}}}{2\sqrt{\frac{98\,279}{24}}\,\sum_{k=0}^{\infty}\left(\frac{98\,279}{24}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{e^{\pi\sqrt{4096/6-1/144}}\,(-1)^{4095}}{2\sqrt{4096-\frac{1}{24}}} = -\frac{\exp\left(\pi\sqrt{\frac{98\,159}{144}}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{144}{98\,159}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{2\sqrt{\frac{98279}{24}}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{24}{98\,279}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{e^{\pi\sqrt{4096/6-1/144}}\,(-1)^{4095}}{2\sqrt{4096-\frac{1}{24}}} = -\frac{\exp\left(\pi\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{98\,303}{144}-z_0\right)^k z_0^{-k}}{k!}\right)}{2\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{98\,303}{24}-z_0\right)^k z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Mathematical connections with some sectors of String Theory

Observations

We note that, from the number 8, we obtain as follows:

8^2

64

$8^2 \times 2 \times 8$

1024

$8^4 = 8^2 \times 2^6$

True

$8^4 = 4096$

$8^2 \times 2^6 = 4096$

$2^{13} = 2 \times 8^4$

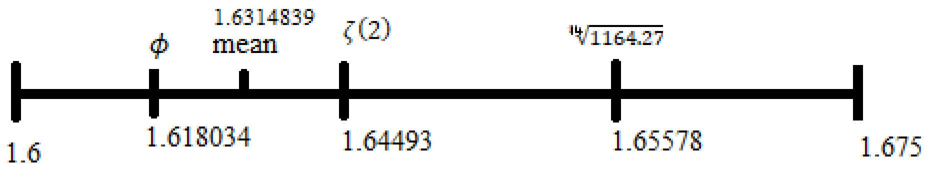
True

$2^{13} = 8192$

$2 \times 8^4 = 8192$

We notice how from the numbers 8 and 2 we get 64, 1024, 4096 and 8192, and that 8 is the fundamental number. In fact $8^2 = 64$, $8^3 = 512$, $8^4 = 4096$. We define it "fundamental number", since 8 is a Fibonacci number, which by rule, divided by the previous one, which is 5, gives 1.6 , a value that tends to the golden ratio, as for all numbers in the Fibonacci sequence

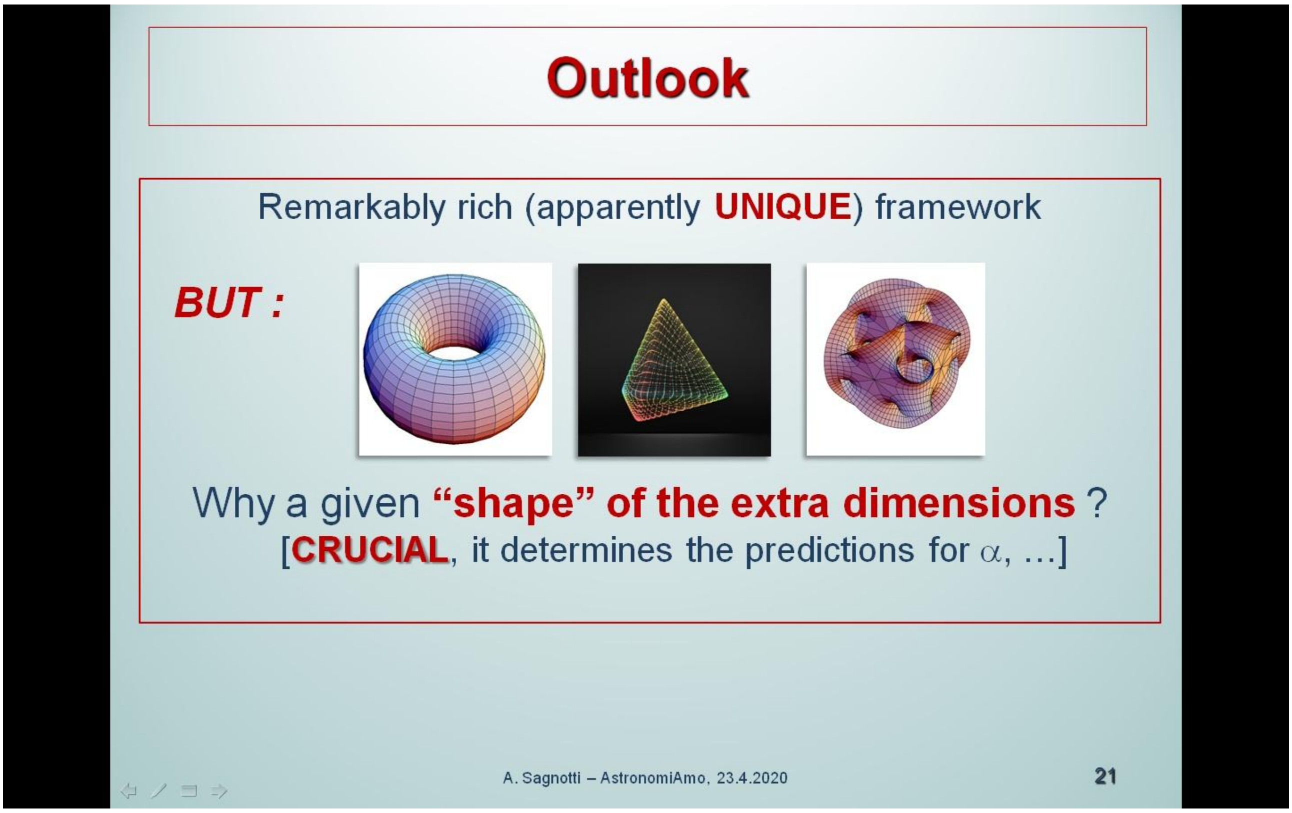
“Golden” Range



Finally we note how $8^2 = 64$, multiplied by 27, to which we add 1, is equal to 1729, the so-called "Hardy-Ramanujan number". Then taking the 15th root of 1729, we obtain a value close to $\zeta(2)$ that 1.6438 ..., which, in turn, is included in the range of what we call "golden numbers"

Furthermore for all the results very near to 1728 or 1729, adding $64 = 8^2$, one obtain values about equal to 1792 or 1793. These are values almost equal to the Planck multipole spectrum frequency 1792.35 and to the hypothetical Gluino mass

We have that:



Outlook

Remarkably rich (apparently **UNIQUE**) framework

BUT :

Why a given **"shape" of the extra dimensions** ?

[**CRUCIAL**, it determines the predictions for α, …]

A. Sagnotti – AstronomiAmo, 23.4.2020

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From: *A. Sagnotti – AstronomiAmo, 23.04.2020*

In the above figure, it is said that: "why a given shape of the extra dimensions? Crucial, it determines the predictions for α".

We propose that whatever shape the compactified dimensions are, their geometry must be based on the values of the golden ratio and ζ(2), (the latter connected to 1728 or 1729, whose fifteenth root provides an excellent approximation to the above mentioned value) which are recurrent as solutions of the equations that we are going to develop. It is important to specify that the initial conditions are **always** values belonging to a fundamental chapter of the work of S. Ramanujan "Modular equations and Appoximations to Pi" (see references). These values are some multiples of 8 (64 and 4096), 276, which added to 4096, is equal to 4372, and finally $e^{\pi\sqrt{22}}$

We obtain, in certain cases, the following connections:

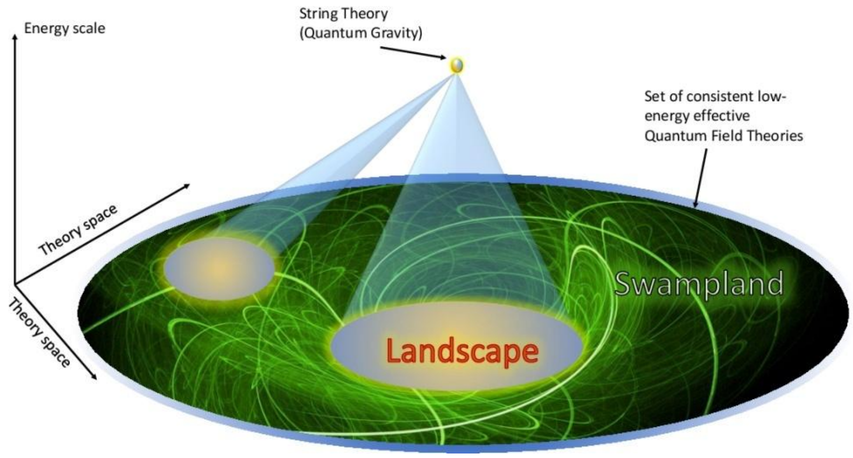
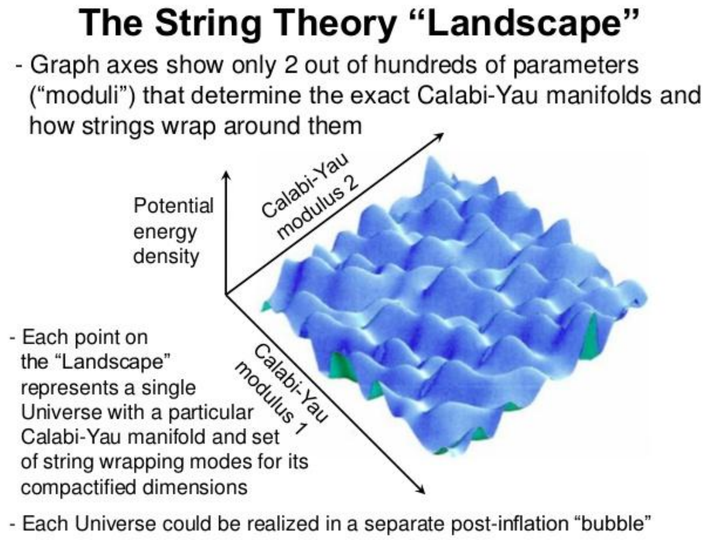


Fig. 1



The String Theory "Landscape"

- Graph axes show only 2 out of hundreds of parameters ("moduli") that determine the exact Calabi-Yau manifolds and how strings wrap around them
- Each point on the "Landscape" represents a single Universe with a particular Calabi-Yau manifold and set of string wrapping modes for its compactified dimensions
- Each Universe could be realized in a separate post-inflation "bubble"

Fig. 2

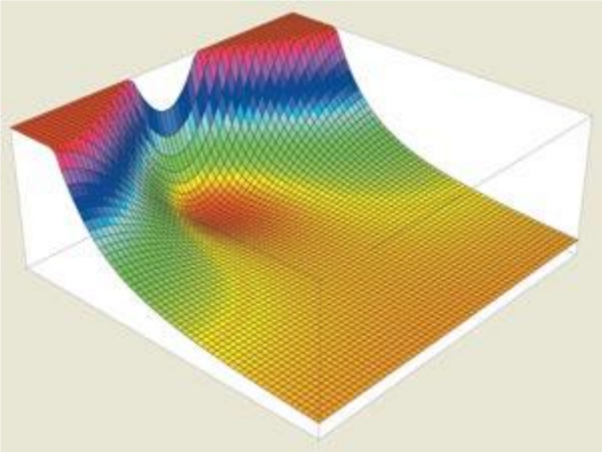


Fig. 3

Stringscape - a small part of the string-theory landscape showing the new de Sitter solution as a local minimum of the energy (vertical axis). The global minimum occurs at the infinite size of the extra dimensions on the extreme right of the figure.

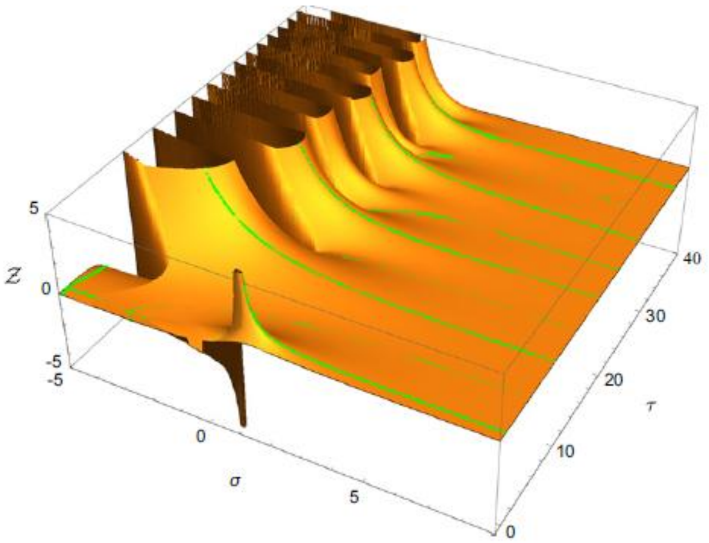


Figure 2. Lines in the complex plane where the Riemann zeta function ζ is real (green) depicted on a relief representing the positive absolute value of ζ for arguments $s \equiv \sigma + i\tau$ where the real part of ζ is positive, and the negative absolute value of ζ where the real part of ζ is negative. This representation brings out most clearly that the lines of constant phase corresponding to phases of integer multiples of 2π run down the hills on the left-hand side, turn around on the right and terminate in the non-trivial zeros. This pattern repeats itself infinitely many times. The points of arrival and departure on the right-hand side of the picture are equally spaced and given by equation (11).

Fig. 4

With regard the Fig. 4 the points of arrival and departure on the right-hand side of the picture are equally spaced and given by the following equation:

$$\tau'_k \equiv k\,\frac{\pi}{\ln 2},$$

with $k = \ldots, -2, -1, 0, 1, 2, \ldots.$

we obtain:

2Pi/(ln(2))

Input:

$$2\times\frac{\pi}{\log(2)}$$

Exact result:

$$\frac{2\pi}{\log(2)}$$

Decimal approximation:

9.0647202836543876192553658914333336203437229354475911683720330958
…

9.06472028365….

Alternative representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log_e(2)}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log(a)\log_a(2)}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{2\coth^{-1}(3)}$$

Series representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{2 i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k}} \quad \text{for } x < 0$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log(z_0) + \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{2 i \pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}}$$

Integral representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\int_1^2 \frac{1}{t}\, dt}$$

$$\frac{2\pi}{\log(2)} = \frac{4 i \pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2 \Gamma(1+s)}{\Gamma(1-s)}\, ds} \quad \text{for } -1 < \gamma < 0$$

From which:

(2Pi/(ln(2)))*(1/12 π log(2))

Input:

$$\left(2\times\frac{\pi}{\log(2)}\right)\left(\frac{1}{12}\,\pi\log(2)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{\pi^2}{6}$$

Decimal approximation:

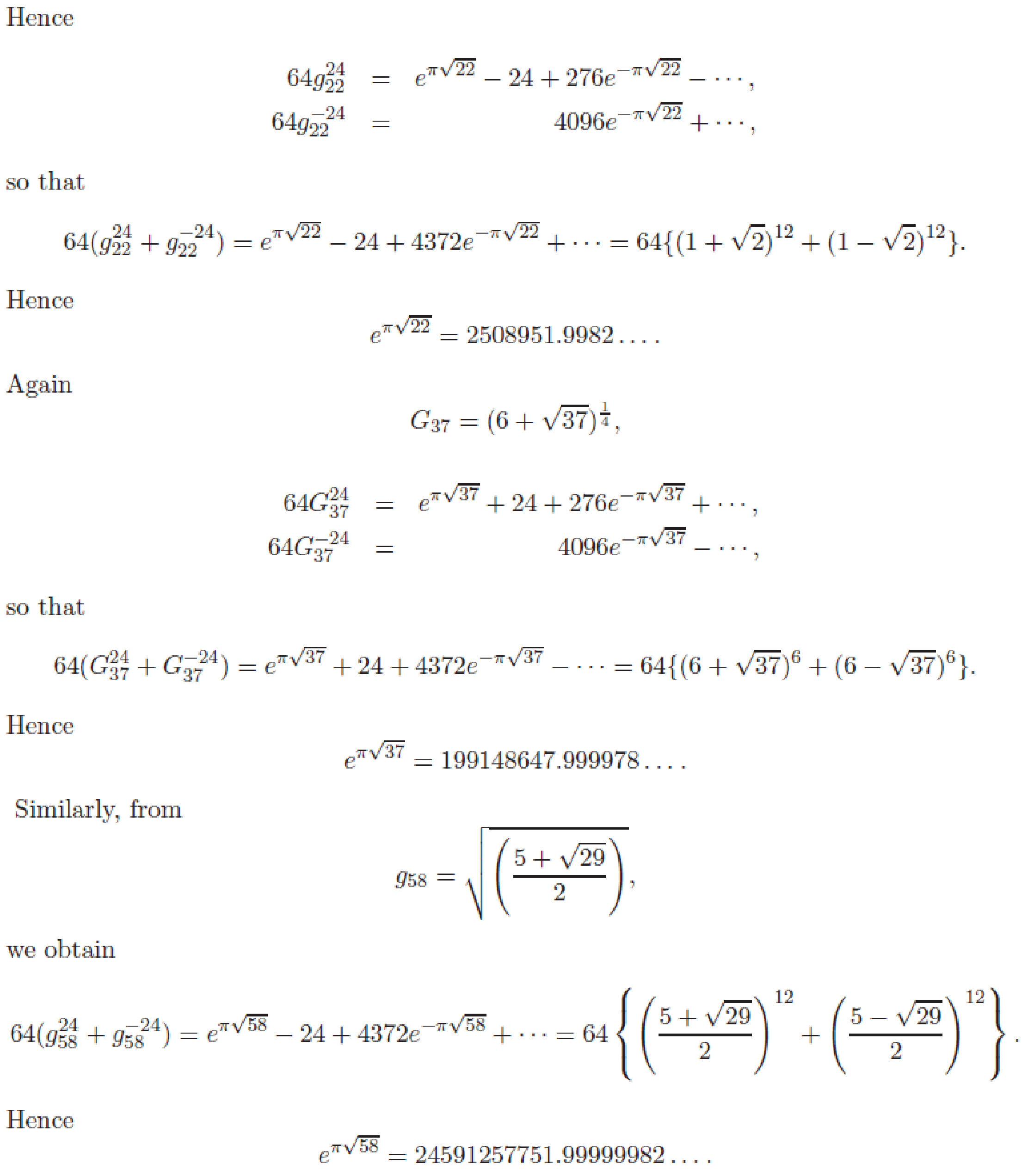
1.6449340668482264364724151666460251892189499012067984377355582293…

$1.6449340668\ldots. = \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

From:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:



Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

We note that, with regard 4372, we can to obtain the following results:

27((4372)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ

Input

$$27\left(\sqrt{4372}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi$$

ϕ is the golden ratio

Result

$$\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)$$

Decimal approximation

1729.052694417090562517063720863714876368418930653845785481544 7023
…

1729.0526944….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5\left(10-2\sqrt{5}\right)}+58\sqrt{5}+432\sqrt{1093}-27\sqrt{2\left(5-\sqrt{5}\right)}-374\right)$$

$$\phi-54+54\sqrt{1093}+\frac{27}{4}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$\phi - 54 + 54\sqrt{1093} - \frac{27\left(\sqrt{10 - 2\sqrt{5}} - 2\right)}{2\left(\sqrt{5} - 1\right)}$$

Minimal polynomial

$$256 x^8 + 95\,744 x^7 - 3\,248\,750\,080 x^6 - 914\,210\,725\,504 x^5 + 15\,498\,355\,554\,921\,184 x^4 + 2\,911\,478\,392\,539\,914\,656 x^3 - 32\,941\,144\,911\,224\,677\,091\,680 x^2 - 3\,092\,528\,914\,069\,760\,354\,714\,456 x + 26\,320\,050\,609\,744\,039\,027\,169\,013\,041$$

Expanded forms

$$-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10 - 2\sqrt{5}} - \frac{27}{8}\sqrt{5\left(10 - 2\sqrt{5}\right)}$$

$$-\frac{107}{2} + \frac{\sqrt{5}}{2} + 54\sqrt{1093} + \frac{27}{\sqrt{5} - 1} - \frac{27\sqrt{10 - 2\sqrt{5}}}{2\left(\sqrt{5} - 1\right)}$$

Series representations

$$27\left(\sqrt{4372} - 2 - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\left(\sqrt{5} - 1\right)2}\right) + \phi = \left(162 - 108\sqrt{1093} - 2\phi - 108\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 2\phi\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} - 27\sqrt{9 - 2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9 - 2\sqrt{5}\right)^{-k}\right) \Bigg/ \left(2\left(-1 + \sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+\right.$$

$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}-$$

$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Big/$$

$$\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}+\right.$$

$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}+$$

$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}-$$

$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(10-2\sqrt{5}-z_0\right)^{k}z_0^{-k}}{k!}\right)\Big/$$

$$\left(2\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Or:

27((4096+276)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ

Input

$$27\left(\sqrt{4096+276}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi$$

ϕ is the golden ratio

Result

$$\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)$$

Decimal approximation

1729.0526944170905625170637208637148763684189306538457854815447023

…

1729.0526944…. as above

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5\left(10-2\sqrt{5}\right)}+58\sqrt{5}+432\sqrt{1093}-27\sqrt{2\left(5-\sqrt{5}\right)}-374\right)$$

$$\phi-54+54\sqrt{1093}+\frac{27}{4}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}$$

Minimal polynomial

$$256\,x^8 + 95\,744\,x^7 - 3\,248\,750\,080\,x^6 - 914\,210\,725\,504\,x^5 + 15\,498\,355\,554\,921\,184\,x^4 + 2\,911\,478\,392\,539\,914\,656\,x^3 - 32\,941\,144\,911\,224\,677\,091\,680\,x^2 - 3\,092\,528\,914\,069\,760\,354\,714\,456\,x + 26\,320\,050\,609\,744\,039\,027\,169\,013\,041$$

Expanded forms

$$-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10 - 2\sqrt{5}} - \frac{27}{8}\sqrt{5\left(10 - 2\sqrt{5}\right)}$$

$$-\frac{107}{2} + \frac{\sqrt{5}}{2} + 54\sqrt{1093} + \frac{27}{\sqrt{5} - 1} - \frac{27\sqrt{10 - 2\sqrt{5}}}{2\left(\sqrt{5} - 1\right)}$$

Series representations

$$27\left(\sqrt{4096 + 276} - 2 - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\left(\sqrt{5} - 1\right)2}\right) + \phi = \left(162 - 108\sqrt{1093} - 2\phi - 108\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 2\phi\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} - 27\sqrt{9 - 2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9 - 2\sqrt{5}\right)^{-k}\right) \Bigg/ \left(2\left(-1 + \sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+\right.$$

$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}-$$

$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Bigg/$$

$$\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)\right)$$

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}+\right.$$

$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}+$$

$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}-$$

$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(10-2\sqrt{5}-z_0\right)^{k}z_0^{-k}}{k!}\right)\Bigg/$$

$$\left(2\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From which:

(27((4372)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ)^1/15

Input

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi}$$

ϕ is the golden ratio

Exact result

$$\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}$$

Decimal approximation

1.6438185685849862799902301317036810054185756873505184804834183124

…

$1.64381856858\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternate forms

$$\sqrt[15]{\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}}$$

$$\frac{1}{\sqrt[15]{\frac{2\left(\sqrt{5}-1\right)}{166-108\sqrt{5}-108\sqrt{1093}+108\sqrt{5465}-27\sqrt{2\left(5-\sqrt{5}\right)}}}}$$

$$\sqrt[15]{\boxed{\begin{array}{l}\text{root of } 256\,x^8 + 95\,744\,x^7 - 3\,248\,750\,080\,x^6 - 914\,210\,725\,504\,x^5 + \\ \quad 15\,498\,355\,554\,921\,184\,x^4 + 2\,911\,478\,392\,539\,914\,656\,x^3 - \\ \quad 32\,941\,144\,911\,224\,677\,091\,680\,x^2 - 3\,092\,528\,914\,069\,760\,354\,714\,456\,x + \\ \quad 26\,320\,050\,609\,744\,039\,027\,169\,013\,041 \text{ near } x = 1729.05\end{array}}}$$

Minimal polynomial

$$\begin{array}{l}256\,x^{120} + 95\,744\,x^{105} - 3\,248\,750\,080\,x^{90} - \\ \quad 914\,210\,725\,504\,x^{75} + 15\,498\,355\,554\,921\,184\,x^{60} + \\ \quad 2\,911\,478\,392\,539\,914\,656\,x^{45} - 32\,941\,144\,911\,224\,677\,091\,680\,x^{30} - \\ \quad 3\,092\,528\,914\,069\,760\,354\,714\,456\,x^{15} + 26\,320\,050\,609\,744\,039\,027\,169\,013\,041\end{array}$$

Expanded forms

$$\sqrt[15]{\frac{1}{2}\left(1+\sqrt{5}\right) + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10-2\sqrt{5}} - 2}{2\left(\sqrt{5}-1\right)}\right)}$$

$$\sqrt[15]{-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10-2\sqrt{5}} - \frac{27}{8}\sqrt{5\left(10-2\sqrt{5}\right)}}$$

All 15th roots of ϕ + 27 (-2 + 2 sqrt(1093) - (sqrt(10 - 2 sqrt(5)) - 2)/(2 (sqrt(5) - 1)))

$$e^{0}\sqrt[15]{\phi + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10-2\sqrt{5}} - 2}{2\left(\sqrt{5}-1\right)}\right)} \approx 1.64382 \text{ (real, principal root)}$$

$$e^{(2 i \pi)/15}\sqrt[15]{\phi + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10-2\sqrt{5}} - 2}{2\left(\sqrt{5}-1\right)}\right)} \approx 1.50170 + 0.6686\,i$$

$$e^{(4i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 1.0999+1.2216\,i$$

$$e^{(2i\pi)/5}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx 0.5080+1.5634\,i$$

$$e^{(8i\pi)/15}\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}\approx -0.17183+1.63481\,i$$

Series representations

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi}=$$
$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+2\phi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)\Big/\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)\wedge(1/15)\right)$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} =$$

$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+\right.\right.\right.$$

$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}-$$

$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Big/$$

$$\left.\left.\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)\right)^{\wedge}(1/15)\right)$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} =$$

$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}+\right.\right.\right.$$

$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}+$$

$$2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}-$$

$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(10-2\sqrt{5}-z_0\right)^{k}z_0^{-k}}{k!}\right)\Big/$$

$$\left.\left.\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(5-z_0)^{k}z_0^{-k}}{k!}\right)\right)^{\wedge}(1/15)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

Integral representation

$$(1+z)^{a}=\frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^{s}}\,ds}{(2\pi i)\,\Gamma(-a)}$$ for ($0<\gamma<-\mathrm{Re}(a)$ and $|\arg(z)|<\pi$)

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\, \frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\,-\,2\,C} \;=\; \frac{h^2\left(p\;+\;1\;-\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}}{(7\;-\;p)}$$

$$(A')^2 \;=\; k\, e^{\,-\,2\,A} \;+\; \frac{h^2}{16(p\;+\;1)}\left(7\;-\;p\;+\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 64^2, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18))   we obtain:

Input:

$$\exp\left(-\pi\sqrt{18}\right)$$

Exact result:

$$e^{-3\sqrt{2}\,\pi}$$

Decimal approximation:

$$1.6272016226072509292942156739117979541838581136954016\ldots \times 10^{-6}$$

1.6272016… * 10^{-6}

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^}{-6}$$

from which:

$$\frac{1}{4096}e^{-6C+\phi} = 1.6272016\ldots * 10\text{^}{-6}$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^}{-6}$$

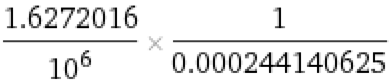
Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

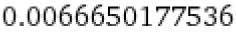
(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:



$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:



0.0066650177536

0.006665017...

Thence:

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625}\, e^{-6C+\phi} = \frac{1}{0.000244140625}\, e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

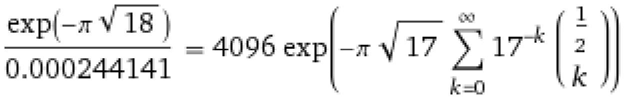
$$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625}$$

Result:

0.00666501785...

0.00666501785…

Series representations:



$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k} \binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

–5.010882647757…

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\mathrm{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t}\, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757\ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.9874428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\cfrac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

(http://www.bitman.name/math/article/102/109/)

The mean between the two results of the above Rogers-Ramanujan continued fractions is 0.97798855285, value very near to the ψ Regge slope 0.979:

Ψ	3	$m_c = 1500$	0.979	-0.09

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}} \approx 0.9991104684$$

From

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

We have:

$$\begin{aligned} e^{2C} &= \frac{2\,\xi\,e^{\frac{\phi}{2}}}{1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}} \\ \frac{h^2}{32} &= \frac{\xi^7\,e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}\right)^7}\left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}\right) + 5\,T\,e^{2\phi}\right] . \end{aligned} \qquad (2.7)$$

For

$T = \frac{16}{\pi^2}$

$\xi = 1$

we obtain:

(2*e^(0.989117352243/2)) / (1+sqrt(((1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))

Input interpretation:

$$\frac{2\,e^{0.989117352243/2}}{1 + \sqrt{1 - \frac{1}{3} \times \frac{16}{\pi^2}\,e^{2\times 0.989117352243}}}$$

Result:

$0.83941881822\ldots - 1.4311851867\ldots\,i$

Polar coordinates:

$r = 1.65919106525$ (radius), $\theta = -59.607521917°$ (angle)

1.65919106525….. result very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.4945586761215000}}{1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.4945586761215000}}{1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.4945586761215000}}{1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From

$$\frac{h^2}{32} = \frac{\xi^7\,e^{4\phi}}{\left(1 \pm \sqrt{1-\frac{\xi T}{3}\,e^{2\phi}}\right)^7}\left[\frac{42}{\xi}\left(1 \pm \sqrt{1-\frac{\xi T}{3}\,e^{2\phi}}\right) + 5\,T\,e^{2\phi}\right]$$

we obtain:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)$$

Result:

50.84107889… −
20.34506335… i

Polar coordinates:

$r = 54.76072411$ (radius), $\theta = -21.80979492°$ (angle)

54.76072411…..

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Bigg/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 = \left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 = \left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not $(z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

From which:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243))))))^7
[42(1+sqrt(1-
1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]*1/34

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)\times\frac{1}{34}$$

Result:

1.495325850… −
0.5983842161… i

Polar coordinates:

$r = 1.610609533$ (radius), $\theta = -21.80979492°$ (angle)

1.610609533…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.98911735224300000}}{\pi^2}\right)e^{4\times 0.98911735224300000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\, e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\, e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\, e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right) =$$

$$\left(40\, e^{5.934704113458000}+21\, e^{3.956469408972000}\,\pi^2+21\, e^{3.956469408972000}\,\pi^2 \sqrt{-\frac{16\, e^{1.978234704486000}}{3\,\pi^2}}\ \sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$

$$\left(17\,\pi^2\left(1+\sqrt{-\frac{16\, e^{1.978234704486000}}{3\,\pi^2}}\ \sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\, e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\, e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\, e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right) =$$

$$\left(40\, e^{5.934704113458000}+21\, e^{3.956469408972000}\,\pi^2+21\, e^{3.956469408972000}\,\pi^2\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\, e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$

$$\left(17\,\pi^2\left(1+\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\, e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Now, we have:

$$e^{2C} = \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3}\,e^{2\phi}}}\,, \tag{2.9}$$

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1 + \sqrt{1 + \frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1 + \sqrt{1 + \frac{\Lambda}{3}\,e^{2\phi}}\right) - 13\,\Lambda\,e^{2\phi}\right]. \tag{2.10}$$

For:

$\xi = 1$

$\Lambda \simeq \frac{4\pi^2}{25}$

$\phi = 0.989117352243$

From

$$e^{2C} = \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3}\,e^{2\phi}}}\,,$$

we obtain:

((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))

Input interpretation:

$$\frac{2\,e^{-0.989117352243/2}}{1 + \sqrt{1 + \frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}}$$

Result:

0.382082347529...

0.382082347529….

Series representations:

$$\frac{2\, e^{-0.98911735224300 00/2}}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300 00}}{3\times 25}}} = 2\Bigg/\left(e^{0.49455867612150 00}\left(1+\sqrt{\frac{4\,e^{1.97823470448600 0}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.97823470448600 0}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{2\, e^{-0.98911735224300 00/2}}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300 00}}{3\times 25}}} = 2\Bigg/\left(e^{0.49455867612150 00}\left(1+\sqrt{\frac{4\,e^{1.97823470448600 0}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.97823470448600 0}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{2\, e^{-0.98911735224300 00/2}}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300 00}}{3\times 25}}} = \frac{2}{e^{0.49455867612150 00}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.97823470448600 0}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)}$$

$$\text{for } (\text{not } (z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

From which:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))))

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}}}$$

Result:

1.65430921270...

1.6543092….. We note that, the result 1.6543092... is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Indeed:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4} \times \left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}} = \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. $\square$

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.97823470448600000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\,\sqrt{\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.97823470448600000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}}} = 1+\frac{e^{0.49455867612150000}}{8}+$$

$$\frac{1}{8}\,e^{0.49455867612150000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

And from

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right].$$

we obtain:

e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))-13*(4Pi^2)/25*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}$$
$$\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)$$

Result:

$-0.034547055658\ldots$

-0.034547055658…

Series representations:

$$\left(\left(42\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}-\frac{1}{25}\left(4\pi^2\right)13\,e^{2\times 0.98911735224300000}\right)\right)\right.$$
$$\left.e^{-4\times 0.98911735224300000}\right)\Big/\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}\right)^7=$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

From which:

47 *1/(((-1/((((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))))))

Input interpretation:

$$47\left(-\left(1/1/\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right.\right.\right.\right.\right.-$$
$$\left.\left.\left.\left.\left.13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)\right)$$

Result:

1.6237116159...

1.6237116159…. result that is an approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$-\left(47/1/\left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.9891173522430000}}{3\times 25}}-\right.\right.\right.\right.$$
$$\left.\left.\left.\frac{1}{25}\left(4\pi^2\right)13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/$$
$$\left.\left.\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)\right)=$$
$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$-(47/1/(e^{-4\times 0.9891173522430000}(42(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}))))/(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}})^7))=$$

$$(1974(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}))/(25\,e^{5.934704113458000}(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!})^7))$$

$$-(47/1/(e^{-4\times 0.9891173522430000}(42(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}))))/(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}})^7))=$$

$$(1974(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}))/(25\,e^{5.934704113458000}(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!})^7))$$

for (not ($z_0\in\mathbb{R}$ and $-\infty < z_0 \leq 0$))

And again:

32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))

Input interpretation:

$$32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)$$

Result:

−1.1055057810...

-1.1055057810….

We note that the result -1.1055057810…. is very near to the value of Cosmological Constant, less 10^{-52} , thence 1.1056, with minus sign

Series representations:

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25} (4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1 + \sqrt{1 + \frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344 \left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1 + \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}\,(4\,\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Bigg/ \left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 = -\left(\left(1344 \left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Bigg/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}\,(4\,\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Bigg/ \left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 = -\left(\left(1344 \left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)\right) \Bigg/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

And:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))]^5

Input interpretation:

$$-\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)^5$$

Result:

1.651220569...

1.651220569…. result very near to the 14th root of the following Ramanujan’s class invariant $Q=\left(G_{505}/G_{101/5}\right)^3=1164.2696$ i.e. 1.65578...

Series representations:

$$-\left(\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5=$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\,e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\Big/\left(9\,765\,625\,e^{19.78234704486000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^{35}\right)$$

$$-\left(\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{35}\right)$$

$$-\left(\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^{35}\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

We obtain also:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))))]^1/2

Input interpretation:

$$-\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}$$

Result:

-0

$1.0514303501\ldots\, i$

Polar coordinates:

$r = 1.05143035007$ (radius), $\theta = -90°$ (angle)

1.05143035007

Series representations:

$$-\sqrt{\left(\left(32\, e^{-4 \times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{\left(4 \pi^2\right) e^{2 \times 0.9891173522430000}}{3 \times 25}}\right.\right.\right.\right.}$$

$$\left.\left.\left.-\frac{1}{25}\left(4 \pi^2\right) 13\, e^{2 \times 0.9891173522430000}\right)\right)\right) \Big/$$

$$\left.\left.\left(1+\sqrt{1+\frac{\left(4 \pi^2\right) e^{2 \times 0.9891173522430000}}{3 \times 25}}\right)^7\right)\right) = -\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\, \pi^2+25 \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}\right.\right.}$$

$$\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right) \Big/ \left(e^{3.956469408972000}\right.$$

$$\left.\left.\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

1 / -[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))- 13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\left(1\Big/\left(\sqrt{32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)}\right)\right)$$

Result:

$0.95108534763\ldots\, i$

Polar coordinates:

$r = 0.95108534763$ (radius), $\theta = 90°$ (angle)

0.95108534763

We know that the primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

Thence 0.95108534763 is a result very near to the spectral index n_s, to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

Series representations:

$$-\left(1\Big/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right.\right.\right.\right.}\right.\right.$$

$$\left.\left.\left.\left.\left.-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\right.$$

$$\left.\left.\left.\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\,\sqrt{\left(\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.\right.}\right.\right.$$

$$\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/$$

$$\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.$$

$$\left.\left.\left.\left.\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)\right)\right)\right)$$

$$-\left(1\Big/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right.\right.\right.\right.}\right.\right.$$

$$\left.\left.\left.\left.-\frac{1}{25}\,(4\,\pi^2)\,13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/$$

$$\left.\left.\left.\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\,\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.}\right.\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$

$$\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.$$

$$\left.\left.\left.\left.\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)\right)\right)$$

$$-\left(1\Big/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}\right)\right)$$

for $(\text{not}\ (z_0 \in \mathbb{R}\ \text{and}\ -\infty < z_0 \leq 0))$

From the previous expression

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)}$$

$= -0.034547055658\ldots$

we have also:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))) + (-0.034547055658)

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}}}-0.034547055658$$

Result:

1.61976215705...

1.61976215705….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224430000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224430000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224430000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224430000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

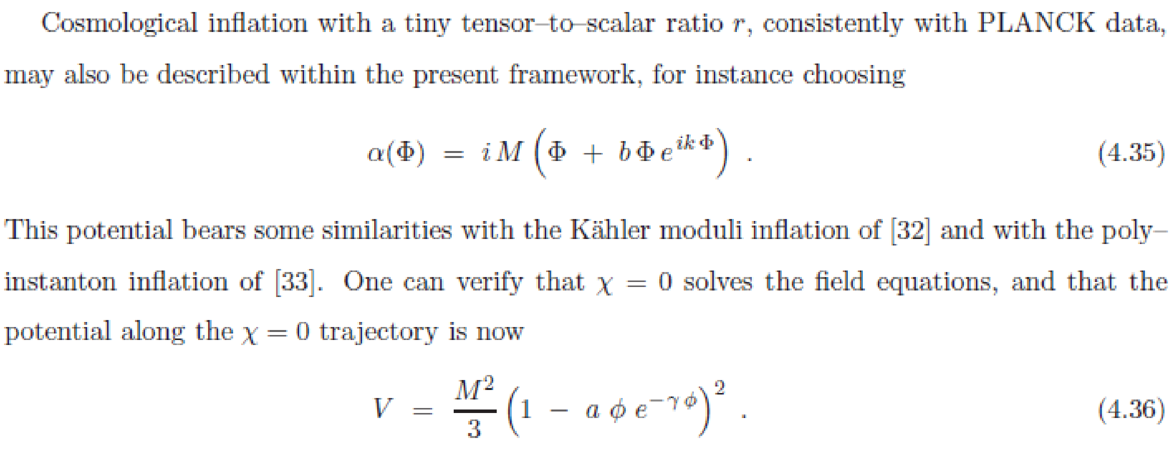
for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From

Properties of Nilpotent Supergravity

E. Dudas, S. Ferrara, A. Kehagias and A. Sagnotti - arXiv:1507.07842v2 [hep-th] 14 Sep 2015

We have that:



Cosmological inflation with a tiny tensor–to–scalar ratio r, consistently with PLANCK data, may also be described within the present framework, for instance choosing

$$\alpha(\Phi)\;=\;i\,M\left(\Phi\;+\;b\,\Phi\,e^{\,ik\,\Phi}\right)\;. \tag{4.35}$$

This potential bears some similarities with the Kähler moduli inflation of [32] and with the poly–instanton inflation of [33]. One can verify that $\chi = 0$ solves the field equations, and that the potential along the $\chi = 0$ trajectory is now

$$V\;=\;\frac{M^2}{3}\left(1\;-\;a\;\phi\;e^{-\gamma\,\phi}\right)^2\;. \tag{4.36}$$

We analyzing the following equation:

$$V\;=\;\frac{M^2}{3}\left(1\;-\;a\;\phi\;e^{-\gamma\,\phi}\right)^2\;.$$

$$\phi\;=\;\varphi\;-\;\frac{\sqrt{6}}{k}\;,$$

$$a = \frac{b\gamma}{e} < 0\,, \qquad \gamma = \frac{k}{\sqrt{6}} < 0\,.$$

We have:

(M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

i.e.

V = (M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

For k = 2 and φ = 0.9991104684, that is the value of the scalar field that is equal to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\dfrac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^{5}\sqrt[4]{5^{3}}}-1}}-\varphi+1} = 1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}} \approx 0.9991104684$$

we obtain:

V = (M^2)/3*[1-(b/euler number * 2/sqrt6) * (0.9991104684- sqrt6/2) * exp(-(2/sqrt6)(0.9991104684- sqrt6/2))]^2

Input interpretation:

$$V = \frac{M^2}{3}\left(1-\left(\frac{b}{e}\times\frac{2}{\sqrt{6}}\right)\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2}{\sqrt{6}}\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\right)\right)^2$$

Result:

$$V = \frac{1}{3}\,(0.0814845\,b+1)^2\,M^2$$

Solutions:

$$b = \frac{225.913\left(-0.054323\,M^2 \pm 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} \quad (M \neq 0)$$

Alternate forms:

$$V = 0.00221324\,(b + 12.2723)^2\,M^2$$

$$V = 0.00221324\left(b^2\,M^2 + 24.5445\,b\,M^2 + 150.609\,M^2\right)$$

$$-0.00221324\,b^2\,M^2 - 0.054323\,b\,M^2 - \frac{M^2}{3} + V = 0$$

Expanded form:

$$V = 0.00221324\,b^2\,M^2 + 0.054323\,b\,M^2 + \frac{M^2}{3}$$

Alternate form assuming b, M, and V are positive:

$$V = 0.00221324\,(b + 12.2723)^2\,M^2$$

Alternate form assuming b, M, and V are real:

$$V = 0.00221324\,b^2\,M^2 + 0.054323\,b\,M^2 + 0.333333\,M^2 + 0$$

Derivative:

$$\frac{\partial}{\partial b}\left(\frac{1}{3}\,(0.0814845\,b + 1)^2\,M^2\right) = 0.054323\,(0.0814845\,b + 1)\,M^2$$

Implicit derivatives

$$\frac{\partial b(M, V)}{\partial V} = \frac{154\,317\,775\,011\,120\,075}{36\,961\,748\,(226\,802\,245 + 18\,480\,874\,b)\,M^2}$$

$$\frac{\partial b(M, V)}{\partial M} = -\frac{\frac{226\,802\,245}{18\,480\,874} + b}{M}$$

$$\frac{\partial M(b, V)}{\partial V} = \frac{154\,317\,775\,011\,120\,075}{2\,(226\,802\,245 + 18\,480\,874\,b)^2\,M}$$

$$\frac{\partial M(b, V)}{\partial b} = -\frac{18\,480\,874\,M}{226\,802\,245 + 18\,480\,874\,b}$$

$$\frac{\partial V(b, M)}{\partial M} = \frac{2\,(226\,802\,245 + 18\,480\,874\,b)^2\,M}{154\,317\,775\,011\,120\,075}$$

$$\frac{\partial V(b, M)}{\partial b} = \frac{36\,961\,748\,(226\,802\,245 + 18\,480\,874\,b)\,M^2}{154\,317\,775\,011\,120\,075}$$

Global minimum:

$$\min\left\{\frac{1}{3}\,(0.0814845\,b + 1)^2\,M^2\right\} = 0 \text{ at } (b, M) = (-16, 0)$$

Global minima:

$$\min\left\{\frac{1}{3}M^2\left(1-\frac{(b\,2)\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2\left(0.9991104684-\frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\}=0$$

$$\text{for }\; b=-\frac{226\,802\,245}{18\,480\,874}$$

$$\min\left\{\frac{1}{3}M^2\left(1-\frac{(b\,2)\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2\left(0.9991104684-\frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\}=0$$

$$\text{for }\; M=0$$

From:

$$b=\frac{225.913\left(-0.054323\,M^2\pm 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}\quad (M\neq 0)$$

we obtain

(225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2

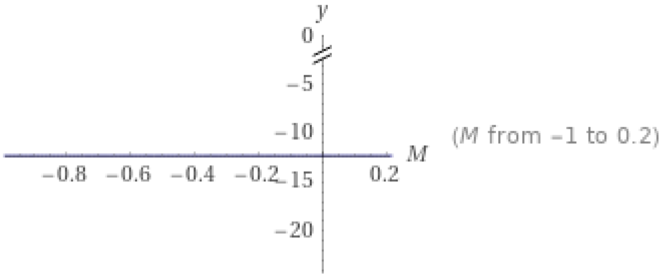
Input interpretation:

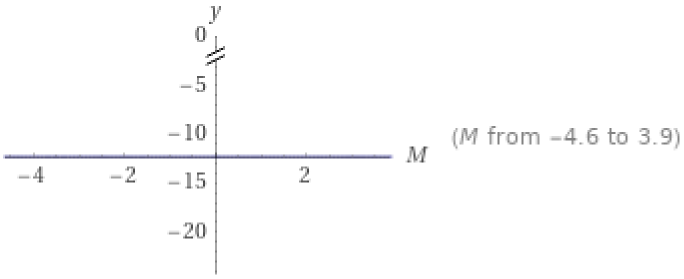
$$\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

Result:

$$\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}$$

Plots:





Alternate form assuming M is real:

-12.2723

-12.2723 result very near to the black hole entropy value 12.1904 = ln(196884)

Alternate forms:

$$-\frac{12.2723\left(M^2-1.21228\times 10^{-8}\sqrt{M^4}\right)}{M^2}$$

$$\frac{1.48774\times 10^{-7}\sqrt{M^4}-12.2723\,M^2}{M^2}$$

Expanded form:

$$\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2} - 12.2723$$

Property as a function:

Parity

even

Series expansion at M = 0:

$$\left(\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2} - 12.2723\right) + O\left(M^6\right)$$

(generalized Puiseux series)

Series expansion at M = ∞:

$$-12.2723$$

Derivative:

$$\frac{d}{dM}\left(\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4} - 0.054323\,M^2\right)}{M^2}\right) = \frac{3.55271\times 10^{-15}}{M}$$

Indefinite integral:

$$\int \frac{225.913\left(-0.054323\,M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}\,dM =$$

$$\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M} - 12.2723\,M + \text{constant}$$

Global maximum:

$$\max\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}\;-0.054323\,M^2\right)}{M^2}\right\} = -\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000} \text{ at } M=-1$$

Global minimum:

$$\min\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}\;-0.054323\,M^2\right)}{M^2}\right\} = -\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000} \text{ at } M=-1$$

Limit:

$$\lim_{M\to\pm\infty}\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} = -12.2723$$

Definite integral after subtraction of diverging parts:

$$\int_0^\infty\left(\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}--12.2723\right)dM=0$$

From b that is equal to

$$\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

From:

$$V = \frac{1}{3}(0.0814845\,b + 1)^2 M^2$$

we obtain:

1/3 (0.0814845 ((225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2) + 1)^2 M^2

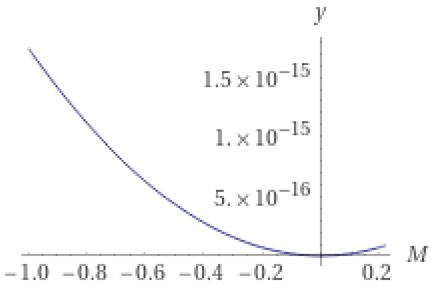
Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

Result:

0

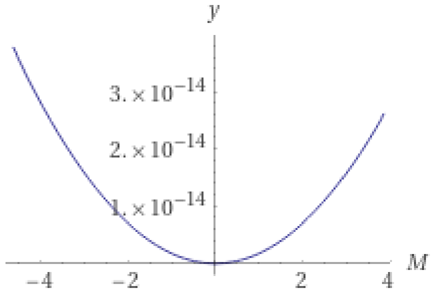
Plots: **(possible mathematical connection with an open string)**



(M from −1 to 0.2)

M = -0.5; M = 0.2

(possible mathematical connection with an open string)



(M from −4.6 to 3.9)

M = 2 ; M = 3

Root:

$M = 0$

Property as a function:

Parity

even

Series expansion at M = 0:

$O(M^{62194})$

(Taylor series)

Series expansion at M = ∞:

$1.75541 \times 10^{-15} M^2 + O\left(\left(\frac{1}{M}\right)^{62194}\right)$

(Taylor series)

Definite integral after subtraction of diverging parts:

$$\int_0^\infty \left(\frac{1}{3} M^2 \left(1 + \frac{18.4084 \left(-0.054323\, M^2 + 6.58545 \times 10^{-10} \sqrt{M^4} \right)}{M^2} \right)^2 - 1.75541 \times 10^{-15} M^2 \right) dM = 0$$

For M = - 0.5 , we obtain:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323\, M^2 + 6.58545 \times 10^{-10} \sqrt{M^4} \right)}{M^2} + 1 \right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 (-0.5)^2 + 6.58545×10^-10 sqrt((-0.5)^4)))/(-0.5)^2) + 1)^2 * (-0.5^2)

Input interpretation:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323\, (-0.5)^2 + 6.58545 \times 10^{-10} \sqrt{(-0.5)^4} \right)}{(-0.5)^2} + 1 \right)^2 \left(-0.5^2 \right)$$

Result:

$$-4.38851344947464545348970783378088020833333333333333333333\ldots \times 10^{-16}$$

$-4.38851344947 * 10^{-16}$

For M = 0.2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 0.2^2 + 6.58545×10^-10 sqrt(0.2^4)))/0.2^2) + 1)^2 0.2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times0.2^2+6.58545\times10^{-10}\sqrt{0.2^4}\right)}{0.2^2}+1\right)^2\times0.2^2$$

Result:

$$7.0216215191594327255835325340494083333333333333333333333333\ldots\times\\10^{-17}$$

$7.021621519159*10^{-17}$

For M = 3:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 3^2 + 6.58545×10^-10 sqrt(3^4)))/3^2) + 1)^2 3^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times 3^2+6.58545\times 10^{-10}\sqrt{3^4}\right)}{3^2}+1\right)^2\times 3^2$$

Result:

$1.579864841810872363256294820161116875\times 10^{-14}$

$1.57986484181*10^{-14}$

For M = 2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 2^2 + 6.58545×10^-10 sqrt(2^4)))/2^2) + 1)^2 2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times 2^2+6.58545\times 10^{-10}\sqrt{2^4}\right)}{2^2}+1\right)^2\times 2^2$$

Result:

$$7.0216215191594327255835325340494083333333333333333333333333\ldots \times 10^{-15}$$

$7.021621519 * 10^{-15}$

From the four results

7.021621519*10^-15 ; 1.57986484181*10^-14 ; 7.021621519159*10^-17 ;

-4.38851344947*10^-16

we obtain, after some calculations:

sqrt[1/(2Pi)(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 - 4.38851344947*10^-16)]

Input interpretation:

$$\sqrt{\left(\frac{1}{2\pi}\left(7.021621519 \times 10^{-15} + 1.57986484181 \times 10^{-14} + 7.021621519 \times 10^{-17} - 4.38851344947 \times 10^{-16}\right)\right)}$$

Result:

$$5.9776991059\ldots \times 10^{-8}$$

$5.9776991059 * 10^{-8}$ result very near to the Planck's electric flow 5.975498×10^{-8} that is equal to the following formula:

$$\phi_{\mathrm{P}}^{E} = \mathbf{E}_{\mathrm{P}} l_{\mathrm{P}}^{2} = \phi_{\mathrm{P}} l_{\mathrm{P}} = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

We note that:

1/55*(([(((1/[(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 -4.38851344947*10^-16)])))^1/7]-((log^(5/8)(2))/(2 2^(1/8) 3^(1/4) e log^(3/2)(3)))))

Input interpretation:

$$\frac{1}{55}\left(\left(1/\left(7.021621519\times 10^{-15}+1.57986484181\times 10^{-14}+7.021621519\times 10^{-17}-4.38851344947\times 10^{-16}\right)\right)\,\hat{}\,(1/7)-\frac{\log^{5/8}(2)}{2\sqrt[8]{2}\,\sqrt[4]{3}\,e\log^{3/2}(3)}\right)$$

$\log(x)$ is the natural logarithm

Result:

1.6181818182…

1.6181818182… result that is a very good approximation to the value of the golden ratio 1.618033988749...

From the Planck units:

Planck Length

$$l_{\mathrm{P}} = \sqrt{\frac{4\pi\hbar G}{c^3}}$$

5.729475 * 10^{-35} Lorentz-Heaviside value

Planck’s Electric field strength

$$\mathbf{E}_\mathrm{P} = \frac{F_\mathrm{P}}{q_\mathrm{P}} = \sqrt{\frac{c^7}{16\pi^2\varepsilon_0\hbar G^2}}$$

1.820306 * 10^{61} V*m Lorentz-Heaviside value

Planck’s Electric flux

$$\phi_\mathrm{P}^E = \mathbf{E}_\mathrm{P} l_\mathrm{P}^2 = \phi_\mathrm{P} l_\mathrm{P} = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

5.975498*10^{-8} V*m Lorentz-Heaviside value

Planck’s Electric potential

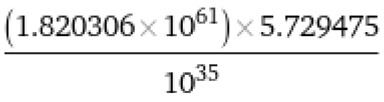
$$\phi_P = V_P = \frac{E_P}{q_P} = \sqrt{\frac{c^4}{4\pi\varepsilon_0 G}}$$

1.042940*10^{27} V Lorentz-Heaviside value

Relationship between Planck's Electric Flux and Planck's Electric Potential

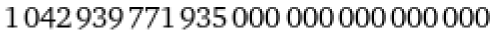
$\mathbf{E_P * l_P}$ = $(1.820306 * 10^{61}) * 5.729475 * 10^{-35}$

Input interpretation:



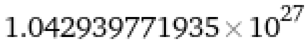
$$\frac{(1.820306\times 10^{61})\times 5.729475}{10^{35}}$$

Result:



1042939771935000000000000000

Scientific notation:



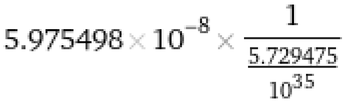
$1.042939771935\times 10^{27}$

$1.042939771935*10^{27} \approx 1.042940*10^{27}$

Or:

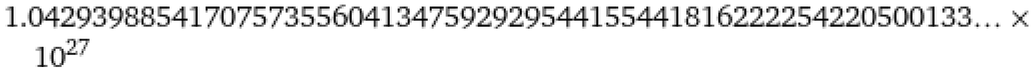
$\mathbf{E_P * l_P^2 / l_P}$ = $(5.975498*10^{-8})*1/(5.729475 * 10^{-35})$

Input interpretation:



$$5.975498\times 10^{-8}\times \frac{1}{\frac{5.729475}{10^{35}}}$$

Result:



$1.04293988541707573556041347592929544155441816222254220500133\ldots \times 10^{27}$

$1.042939885417*10^{27} \approx 1.042940*10^{27}$

Acknowledgments

We would like to thank Professor **Augusto Sagnotti** theoretical physicist at Scuola Normale Superiore (Pisa – Italy) for his very useful explanations and his availability

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